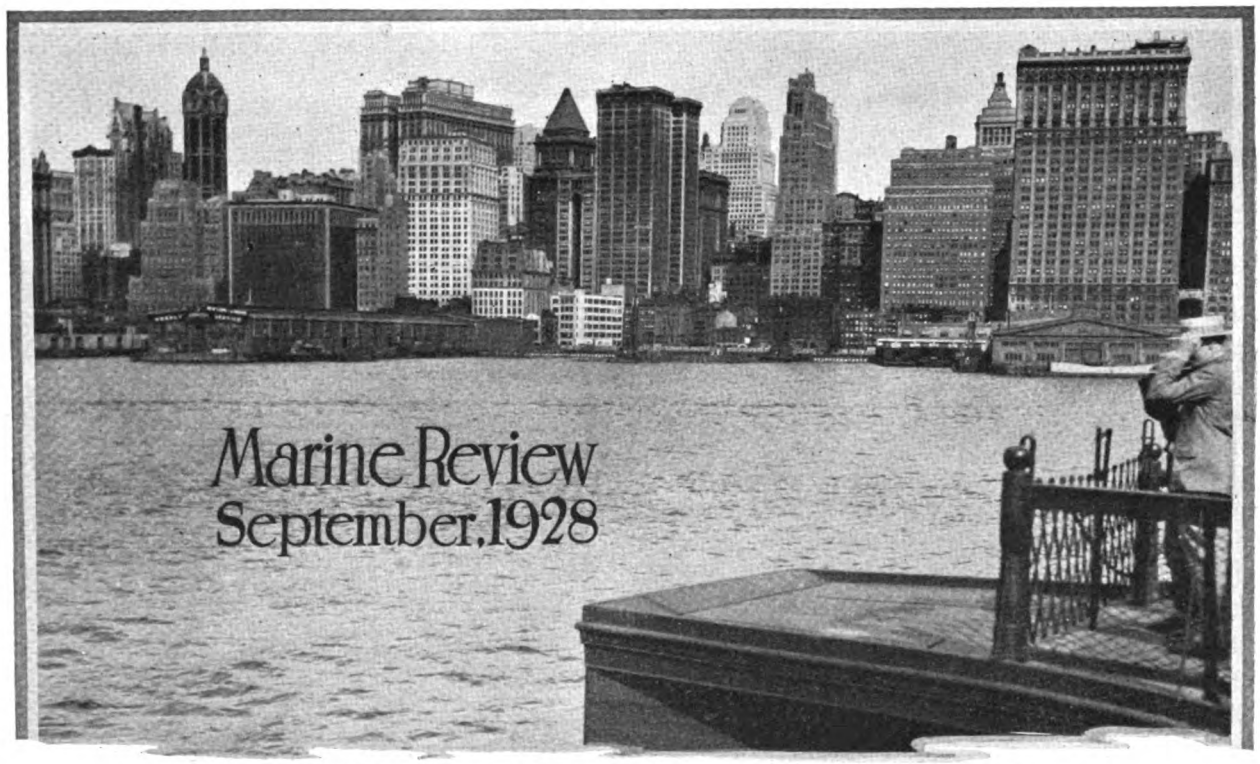

New York—The World's Greatest Port—Intense Development of Basic Facilities Must be Continued

Real Port Development is Necessary to Increase Shipping and Commerce

By Harrison S. Taft

PORT development, with its planning, financing and building of modern shipping facilities, occupies the same relation to a port, its city and its hinterland, as do the railroads and their terminals to the community which they serve. Railroads and ships have got to operate at a profit—otherwise they cannot exist except by taxing the people. To expect a train to wait at a country town or at a road crossing until a trainload of passengers or a trainload of freight is solicited and assembled is as absurd as to expect a ship to anchor in the stream awaiting for its captain to scurry around the country looking for and collecting a cargo of freight for his vessel after she has actually reached port. While such a mode of operation was perhaps the custom back in the times of wooden clipper ships, it most certainly would spell fiscal ruin to the ship owner in present day competition.

Railroads earn money in the hauling of passengers, freight, the mail and other commodities. In general, ships earn money when engaged in moving passengers, cargoes, etc., from port to port; not when laying idle in the stream, at the dock, in the repair yards, or in going from port to port in ballast seeking cargoes. Years ago the transatlantic passenger vessels were allowed to remain in port for one whole week before setting sailing again, representing half a month loss in operating time per round trip of one month. Nowadays they put to sea again in the shortest possible space of time so as to enhance their earning power. While at times ships do have to lay in port awaiting its cargo or for other causes, it is always to the detriment of their earning power.

The railroads provide terminals and facilities so that passengers can collect in large numbers and then quickly board the trains and proceed with the least possible delay to their destination for a quick embarkment and departure to their places of business; to their homes or to other social engagements. And likewise with the assembling, dispatching and delivery of freight, though not so rapidly executed as with passengers, the mail and express service.

The prime object of port development and the construction of up-to-date facilities is to provide an economical means for the assembling and transferring of freight to the vessels and vice

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versa, giving the shipper, as well as the ship owner, the benefits of the saving with which goods can be economically moved and the rapidity with which the ship can get its dispatch. These two are very important items in getting the products of the factories or of the fields to the ultimate consumer, both in the exporting as well as the importing of commodities, in foreign as well as in domestic trade.

Modern port facilities furnish a place where perishable goods or commodities can be assembled and held for periods of time awaiting shipment in bulk or for a better market to sell in. Naturally each community must develop its port facilities to suit the products of its hinterland, as well as of its own factories and those of its serving cities and of the freight that will pass through its port and over its docks in seeking the markets of the world. Likewise for the world's commodities seeking the various ports for distribution to the ultimate consumer.

Modern Facilities Are Vital

It is a fallacy to expect shipowners and operators to be sending their ships to ports lacking in modern, up-to-date port facilities for a quick dispatch, suited to the trade of the port. What shipowner of Cleveland would think of sending his ore laden vessels to a port where the old fashioned method of shovel and barrow were used for the unloading of the ore with such magnificent unloading devices as found at Ashtabula, Fairport and other harbors on Lake Erie. Or to dispatch a grain vessel to a port wherein there were no grain elevators? Or a coal laden vessel to a port whose facilities were for the handling of lumber only? To be sending a refrigerator ship to Calcite with perishable goods or an oil tanker to Central America for fruit are as equally absurd. Modern shipping is not done on that basis and when the St. Lawrence river project becomes a reality, the city and port which is ready with modern docking, cargo handling devices, warehouses, cold storage, fueling stations, repairing facilities, drydocks, etc., each suited to the traffic of its community and its hinterland, will be the ones into which the ships will proudly sail in delivering their oversea cargoes and in taking on of new ones in going back and forth from the Great Lakes to the oceans and ports of the world. They will come and go from the ports which are ready for them and not be a-sailing around the Great Lakes looking for a port to handle their cargoes.

Every city on the Great Lakes cannot expect to develop into a big seaport once the St. Lawrence project becomes a reality. It is those cities and sections so located as to possess the commercial, industrial, financial, and geographical basis that will permit of the commodities of its own community and of its hinterland being cheaply assembled in volume for the ships which seek the Great Lakes for cargoes and the similar distribution of the cargoes ships bring to the respective ports, all economically and expeditiously financed. Cities at the western end of Lake Erie, communities at the lower end of Lake Michigan, and ports at the west end of Lake Superior are far better situated geographically to serve the vast communities and the hinterland that lays back of the Great Lakes, down the Ohio valley, in the Mississippi valley and still farther distant to the agricultural fields of the Northwest than any other points on the Lakes.

The production commodities of New York City do not make that port the leading shipping center of the United States. It is the strength, the wide ramification, the intense development, etc. of her basic facilities, commercially as well as fiscally, that makes New York the one big city and port of the nation. The one focusing point of almost every activity in the country life, commercially, industrially, fiscally, professionally, socially, etc., tends to make her position in the nation's affairs unchallengeable.

One ship a year with a cargo of diamonds valued at billions of dollars will never create a port. It is the vast tons of low or moderate price commodities that keep the ships going over the seas of the world and in and out of its ports and not otherwise. It is the volume of pay freight that calls for the profitable expenditure of vast sums of money in the developing of and building up of modern port facilities and their communities on the four water front sections of our country and not a few ships each year with high valued commodities which few, if any, can afford to purchase.

Needs Far Sighted Planning

Port development is not a thing to start today, finish tomorrow, involving as it does in many cases, acts of legislature, organizing, devising and laying out of comprehensive schemes, etc., for the full development of a port, condemnation of land, government co-operation in way of dredging and deepening channels or in the removal of sand bars at the mouth of the river, etc. As the old saying is "tomorrow never comes." San Francisco started to develop its port facilities in 1851 and went through several types of construction before it reached its present state of modern development of its wharves, docks and other port facilities. Some eighteen years were spent in the establishing of the highly developed Port of Los Angeles from the date of its first agitation to the finishing of its first modern unit. It took Seattle sixty years of hard work and persistent endeavor to work out all the involved questions in connection with one unit of her present port development, involving as it did questions of government concern, county affairs, city undertakings and private invested interests to a very large sum. Other of our large cities like New York, have been working away at the question almost since their existence and are still spending vast sums in bringing and keeping their shipping facilities up-to-date, so as to meet the ever increasing size of the ships which seek her docks.

Port Development Not Local

Port development is not a local question as is that of sewers, subways, parks and boulevards and other city problems. Ports have to be developed to meet the traffic of the world as well as that of the ports hinterland and of the port itself, with cargo laden vessels coming and going to all nations on the face of the globe, not alone via the sea, but even now via air, involving a vast variety in the class of commodities handled in a port, calling for the establishment of the so-called "Air Ports," as well as the long familiar "Ship Ports." Even the ships themselves are not all alike in their design and construction or is their design under the control of one man. Thus the problem offers a very wide range for study and planning in its execution and is perhaps one of the most interesting one that a young engineer can take up and devote his life to, especially those with a leaning and hankering for the sea and its romance, giving as it does, a world-wide vision of life; not otherwise.

The Alabama Dry Dock Co. of Mobile, Ala., will convert the tug HULVER, owned by the Tennessee Coal & Iron Co., from a coal burner to an oil burner. The Coen Co.'s latest improved mechanical atomizer oil burning system will be used in making this conversion.

The author, Harrison S. Taft, is a construction engineer, 1015 Transportation building, Detroit.

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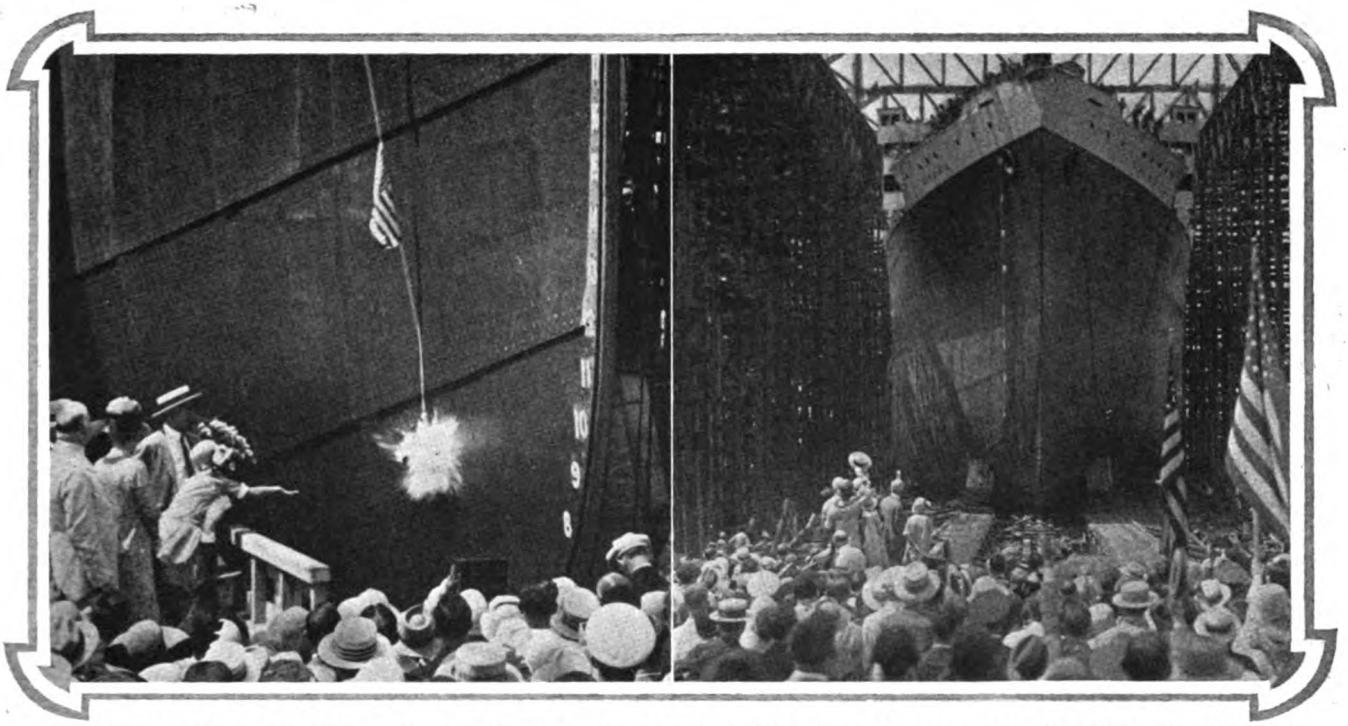

Launching of the S. S. Virginia at Newport News, Aug. 18, 1928. Left—Miss Anne Thomas, sponsor, "I christen thee Virginia." Right—On her way into the waters of the James River

Largest American Built Liner Is Launched at Newport News

By E. C. Kreutzberg and H. R. Simonds

THE old days are coming back again" was the comment made by a motherly looking matron at a dinner-dance at the Hotel Chamberlain, Old Point Comfort, Va., Aug. 18, to celebrate the launching at Newport News, earlier that day, of the giant new VIRGINIA, largest vessel ever built in an American yard.

Despite the sweltering heat of a sunshiny breezeless August day, the launching was attended by great satisfaction and enthusiasm. In the first place, it was as perfect a launching as has been seen in a long time. The mighty ship started without a tremor and, slowly gathering momentum, rode grandly down the ways without the slightest list or hitch at any stage of the journey. In the second place, the Newport News yard will start immediately the construction of the third ship of the CALIFORNIA-VIRGINIA series, and in addition has a large amount of other work under way, so that the launching of the VIRGINIA leaves no aching void in the construction schedule at Newport News.

"The north end of the yard," said an edition of the Shipyard bulletin which was circulated among visitors at the launching, "reminds one of the old times, with four vessels rapidly taking shape on the ways."

General Particulars S. S. Virginia

Length over all, feet, inches	614-0
Length on water line, feet, inches	595-0
Length between perpendiculars, feet, inches	587-0
Beam molded, feet, inches	80-0
Beam at promenade deck, feet, inches	77-0
Depth to shelter deck, feet, inches	52-0
Depth to upper deck at side, feet, inches	42-6
Load draft to bottom of bar keel, feet, inches	32-3
Camber, all decks in 80 feet, inches	0-6
Gross tonnage	22,000
Displacement, tons	30,250
Dead weight carrying capacity, tons	15,300
Capacity of fuel oil compartment, tons	5,100
Maximum shaft horsepower	17,000
Normal shaft horsepower	13,500
Normal speed, service conditions, knots	16½
Twelve Babcock & Wilcox water tube boilers	
Two main propulsion motors, one directly connected to each propeller shaft	
Two General Electric steam turbines each direct connected to alternating current generators	
Two propellers of three-blade type, 18 feet in diameter	

Work on the ways includes the scout cruisers HOUSTON and AUGUSTA, and a large yacht which is being built for George F. Baker, Jr. With the VIRGINIA now launched and in the water, the keel for another vessel just like her will be laid in a few days.

Another feature is that the yard at Newport News is undergoing considerable improvement with the purpose of cutting down the cost of shipbuilding. Much of the hauling between different departments of the yard is done by means of a fleet of 17 trucks and two tractors, and to expedite their movement the company now is reconstructing the 4½ miles of road in the yard at a cost of $3000 a mile. Many improvements have been made in the wood-working department, an appropriation has been made to rebuild the pipe bending shop, a new oxygen plant is under construction and many other improvements have been made. One interesting feature is that the company has installed special rigging for making sub-assemblies which may be set in place in the hull as complete units. In other words, the art of shipbuilding is being pushed with unusual vigor and success at Newport News.

P. A. S. Franklin, president of the

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International Mercantile Marine Co., owner of the new VIRGINIA, journeyed to Newport News for the launching with a large party of officials of the company and guests. The officials of the company who made the trip included Capt. Roger Williams, Capt. Thomas H. Lyon, Fred Bird, A. J. McCarthy, J. H. Thomas, Thomas M. Keresey, and others. The most important figure for the day, however, was little Anne Thomas, 11-year-old daughter of J. H. Thomas. Miss Thomas acted as sponsor and old hands declared later in the day that she christened the VIRGINIA with a calm confidence rarely witnessed. Homer L. Ferguson, president of the Newport News Shipbuilding & Dry Dock Co., in fact, declared after the launching that if there were such a profession as that of sponsor, Miss Thomas was rarely qualified in that direction. Mr. Ferguson presented to the youthful sponsor, on behalf of his company, a beautiful pearl necklace.

Commissioner Jefferson Myers of the shipping board served as spokesman at the occasion for the board. He was accompanied on the visit by his fellow commissioners A. H. Denton and S. S. Sandberg, by General A. C. Dalton, vice president and general manager of the shipping board and by John Nicolson, counsel for the shipping board over the shipbuilding program now in progress by the International Mercantile Marine Co. The three vessels of which the

A. J. McCarthy
Manager, Panama Pacific Line

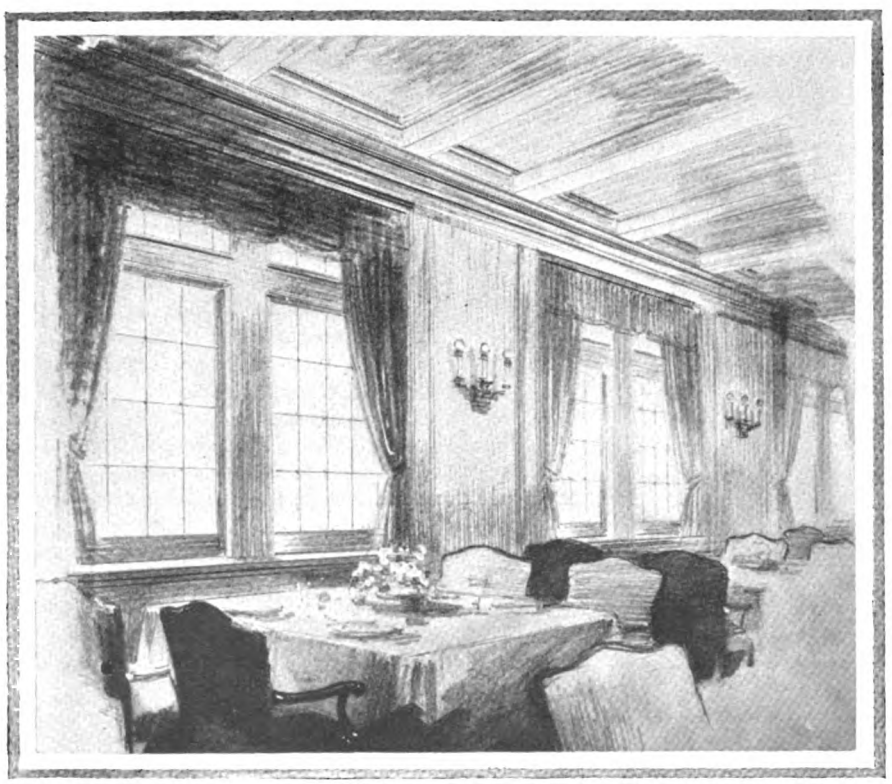
CALIFORNIA and VIRGINIA are the first two, said Mr. Myers, will comprise a fleet of which the entire country may be proud, and he expressed a feeling of pleasure over the co-operation on the part of the shipping board which has made this building program possible.

Mr. Franklin's address contained reference to the fact that the International Mercantile Marine Co. will have to pay more than $30,000 for each round trip of each of the three new vessels because of Panama canal tolls. Inasmuch as it never was intended that the Panama canal should be operated for any large profit, said Mr. Franklin, it is to be hoped that the present basis of charging will shortly be modified by the government in order that the canal tolls may be more reasonable. In the meantime, however, this excessive charge is proving quite a handicap in the operation of the Panama Pacific line.

The shipbuilding program of the International Mercantile Marine Co., said Mr. Franklin, will give the Panama Pacific line a service between New York and California of the most modern, electrically driven passenger carrying steamers, sailing from each coast fortnightly. The VIRGINIA, said Mr. Franklin, has been scheduled to leave New York for her maiden trip to the Pacific coast on Dec. 8. When the third of the three sister ships has been completed, he said, weekly sailings will be made from each coast. It is expected such frequency in sailings will be possible around the end of 1929.

The extent to which all parts of the country benefit from shipbuilding activity was brought out by Mr. Ferguson. The materials entering into the construction of the VIRGINIA, he declared, come from all states of the union and practically every industry in the country contributes something for such a ship. Too, the ship contains the products of the labor of countless numbers of individuals in some degree at least. He spoke about the value of ships to all industries from a transportation standpoint and he further mentioned the features of design of these vessels which permit their use as naval auxiliaries by the United States navy in times of war.

As is usual when new ships are slid into the water at Newport News, the launching of the VIRGINIA was an event for the entire countryside. Despite the broiling sun, there was a huge crowd in attendance at the launching. This included the families of officials and workers at the yard, and large numbers of people from the entire district. There were many evidences of the pride which the people all through that country feel for the shipyard and of the strong feelings of loyalty and affection which they have for its management. A good many small industries continue to flourish at Newport News, but essentially the shipyard there is the dominating industry and the community is fundamentally a shipbuild-



Artist's sketch showing a corner in the Dining Room on the S. S. Virginia. Scheme of architecture and decoration is early American

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ing center as it has been for years.

The launching of the VIRGINIA furnishes an unusual tribute to the care and skill of the original designers of her sister ship the CALIFORNIA, completed last January, for the owner after careful study of the operation of the CALIFORNIA has made almost no changes at all in the equipment or construction details of this second ship. The overall length of the VIRGINIA is 13 feet greater than that of the CALIFORNIA, which makes her the largest ship ever built in America. In addition the VIRGINIA has 500 tons more cargo refrigerating space than the CALIFORNIA. This change was made after the CALIFORNIA had demonstrated that there was a big demand for this space from California fruit shippers.

A Well Designed Vessel

Like the CALIFORNIA the VIRGINIA is a first class ocean liner designed to meet the requirements of any trade. She is 614 feet long, has a beam of 80 feet, a displacement of 34,000 tons and is 52 feet in depth. She is designed to carry over 800 passengers, 400 in first class and 400 in tourist cabin, and more than 8500 tons of perishable and semi-perishable freight. The crew will total 380. A speed of 16½ knots will enable her to make the run from New York to California, through the canal in 14 days.

Few merchant vessels use the electric type of propulsion embodied in the VIRGINIA and it is still a novelty in marine circles even though the CALIFORNIA power plant was extensively described. The electric energy used to drive these two ships through the water is generated by relatively small steam turbines which, in turn, drive generators at the rate of 2800 revolutions per minute. Each ship in this way develops about 20,000 horsepower which is transmitted by cables to the large electric motors. These are direct connected to the propeller shaft. Each vessel has two propellers and therefore two motors.

The fact that the generators and turbines are connected with the motors by cables means that they may be placed at the most advantageous part of the vessel's hull, and this adds greatly to the roominess and general convenient arrangement of the motor room. The propellers are 18 feet in diameter and weigh 39,000 pounds each. These revolve at about 110 revolutions a minute at full speed. They are made of manganese bronze, have three blades each and are of the built up type. The motors and turbo-generators were furnished by the General Electric Co. whose engineers worked with the designers in perfecting the general scheme of propulsion of these electrically driven ships.

At Launching of the S. S. Virginia. Left to Right—John Nicolson, Shipping Board Counsel; Eleanor McCarthy, maid of honor; Shipping Board Commissioners A. H. Denton and S. S. Sandberg; P. A. S. Franklin, president of the I.M.M. Co.; Shipping Board Commissioner Jefferson Myers; Miss Anne Thomas, sponsor; and J. H. Thomas, vice president of the I.M.M. Co.

The steam plant consists of 12 Babcock & Wilcox marine watertube boilers which are oil fired by means of 48 Peabody burners. Full details of the rest of the equipment are given in MARINE REVIEW of February, 1928.

The interior decorating scheme of the VIRGINIA, although differing in its color scheme and in many minor details, follows the general plan adopted for the CALIFORNIA, which is a marine adaptation of early American home architecture. In the lounge on A deck of the VIRGINIA an added spaciousness has been achieved by eliminating the supporting pillars. This has been done by using heavy overhead girders concealed in the ceiling design. The walls of this room will be tinted in a soft shade of green with moldings in a lighter tone. Unusually attractive mural paintings have been made to conform to the decorative scheme. One of these shows Washington's family at Mount Vernon. One is a six-foot chart by Stewart Travis, and another represents the arrival of Capt. John Smith at Chesapeake bay in 1607.

The VIRGINIA was built by the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., following plans that were originally laid out by Ernest H. Rigg, and completed by engineers of the owner, the International Mercantile Marine Co., and of the builder. The entire force of the shipbuilding company has entered

(*Continued on Page* 64)

A. J. McCarthy, Manager, Panama Pacific Line

A J. McCARTHY, manager of the Panama Pacific line which operates the VIRGINIA *and the* CALIFORNIA *in a coast to coast service, has had 30 years experience in marine affairs with the International Mercantile Marine Co., and its associated lines. In November,* 1899, *he entered the offices of the Leyland line at Montreal and since that time has served in many capacities both in the freight traffic and operating departments. From Montreal, he went to Portland, where he remained until he was appointed manager at Quebec of the Leyland line. In* 1915 *he was made assistant manager of the associated lines at Boston, and in* 1917 *he was transferred to New York with increased responsibilities. In addition to being manager of the Panama Pacific line he is the International Mercantile Marine Co. representative in the American Steamship Owners association. He is a member of various committees on navigation laws and rules.*

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Europeans Build Diesel Ships

Danish, Norwegian and British Shipowners Continue to Add Efficient Modern Diesel Vessels to Their Fleets—Improved Machinery and Hulls

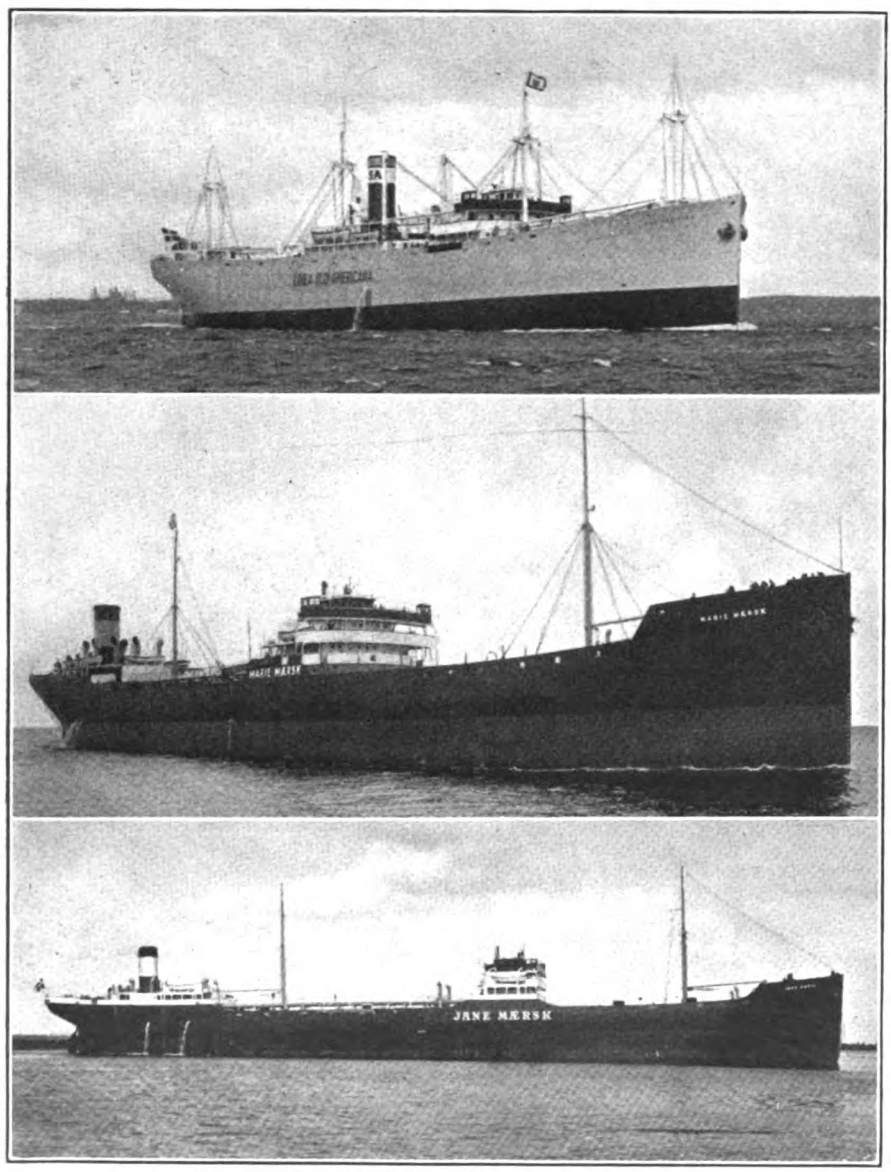
By A. H. Jansson

STEADILY and without interruption foreign shipowners are modernizing their fleets. Some very fine diesel engined freighters and tankers have recently been completed abroad. Of these, six new vessels, three freighters and three tankers are shown in the accompanying illustrations. Some of the details of construction and machinery and the general dimensions are given below.

Freighter Sud Pacifico

THE SUD PACIFICO, a twin screw diesel cargo vessel was built by Burmeister & Wain Ltd. for the Linea Sud Americana for service between North and South America. General dimensions are: Length between perpendiculars, 380 feet; breadth molded, 53 feet 6 inches; depth to shelter deck, 38 feet; gross tonnage, 4639; deadweight, 8130 tons; load draft, 25 feet 5½ inches. The propelling machinery consists of 2 six-cylinder, four cycle, single acting, long stroke Burmeister & Wain diesel engines of crosshead type. Total indicated horsepower at 100 revolutions per minute for both engines is 3600.

A successful trial trip was held June 28. The main engines develop a total of 3988 indicated horsepower at 112.23 revolutions per minute, giving a speed of 13.57 knots.



Upper—Sud Pacifico, Twin Screw Diesel Cargo Vessel. Middle—Marie Maersk, Twin Screw Diesel Tanker. Lower—Jane Maersk, Twin Screw Diesel Tanker

Tanker Marie Maersk

THIS vessel named the MARIE MAERSK is a twin screw diesel tanker built by Burmeister & Wain for A. P. Moller for carrying oil in bulk. General dimensions are Length overall, 483 feet 7½ inches; length between perpendiculars 466 feet; beam, 61 feet 6 inches; depth to main deck, 36 feet 3 inches; draft loaded, 26 feet 9 inches; deadweight capacity, 12,710 tons; gross tonnage, 8278. The propelling machinery consists of two sets of six-cylinder, four cycle, single acting Burmeister & Wain diesel engines with a total indicated horsepower of 3440 at 145 revolutions per minute.

The MARIE MAERSK is built on the Isherwood bracketless system and is divided into ten center tanks and ten side tanks with a total capacity of 613,550 cubic feet. The space forward of the oil tanks is arranged as a cargo hold and has a grain capacity of 30,350 cubic feet. This vessel carries 1065 tons of diesel oil for bunkers giving her a sailing radius of 20,000 miles. All the auxiliaries in the engine room are electrically driven. There are two cylindrical boilers with a total heating surface of 2600 square feet. The working pressure is 180 pounds per square inch.

The trials of the diesel tanker MARIE MAERSK were held June 14 in the Sound at Copenhagen. A speed of 12 knots was attained with the main engines developing a total of 3509 indicated horsepower at 148.25 revolutions per minute.

Tanker Jane Maersk

THE JANE MAERSK is a twin screw diesel tanker and was built by the Odense Steel Ship Yards, Denmark for A. P. Moller, Copenhagen. The vessel is similar to the MARIE MAERSK, being, however, somewhat smaller. The dimensions are: Length overall, 479 feet 2 inches; length between perpendiculars, 456 feet; beam, 59 feet 6 inches; depth, 35 feet 9 inches; load draft at summer free board, 26 feet 8 inches; and corresponding deadweight, 11,775 tons. The hull is built

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on the Isherwood bracketless system with two longitudinal bulkheads through all cargo heads. There are nine main tanks and ten side tanks.

Propelling machinery which is located aft consists of two 4-cycle, six-cylinder, single acting Burmeister & Wain diesel engines. The total indicated horsepower for both engines is 3200 at 145 revolutions per minute. The auxiliary machinery is electrically driven, there being two 100 brake horsepower auxiliary diesel engine generating sets. There are two oil burning, single ended, scotch boilers of 2525 square feet heating surface for providing steam for cargo pumps.

The trial trip of the JANE MAERSK was held June 20. A speed of 11.81 knots was attained with the two engines developing a total of 3240 indicated horsepower.

Freighter Bretagne

THE motorship BRETAGNE single screw, diesel cargo vessel was built by Burmeister & Wain for the Danish French Steamship Co., Copenhagen for general cargo service. The principal dimensions are: Length between perpendiculars, 325 feet; beam molded, 49 feet 10 inches; depth molded to main deck, 23 feet; load draft, 20 feet 6 inches; deadweight capacity, 5500 tons; gross tonnage, 3177; bale cargo capacity, 273,500 cubic feet.

Propelling machinery consists of one, single acting, long stroke crosshead type, six-cylinder, standard Burmeister & Wain diesel engine of 1600 indicated horsepower at 95 revolutions per minute.

There are five cargo hatches all 20 feet wide, and beginning with No. 1 respectively 24 feet 9 inches; 27 feet 6 inches; 27 feet 6 inches and for the last two 30 feet long. There are ten 3-ton steel tube derricks, two for each hatch and ten 3-ton electric winches.

The trial trip took place in the Sound at Copenhagen, May 12. A speed of 11.8 knots was attained with the main engine developing 1891 indicated horsepower at 109 revolutions per minute. A fuel consumption test gave a mean fuel oil consumption of 134.4 grams per indicated horsepower per hour.

Freighter King Stephen

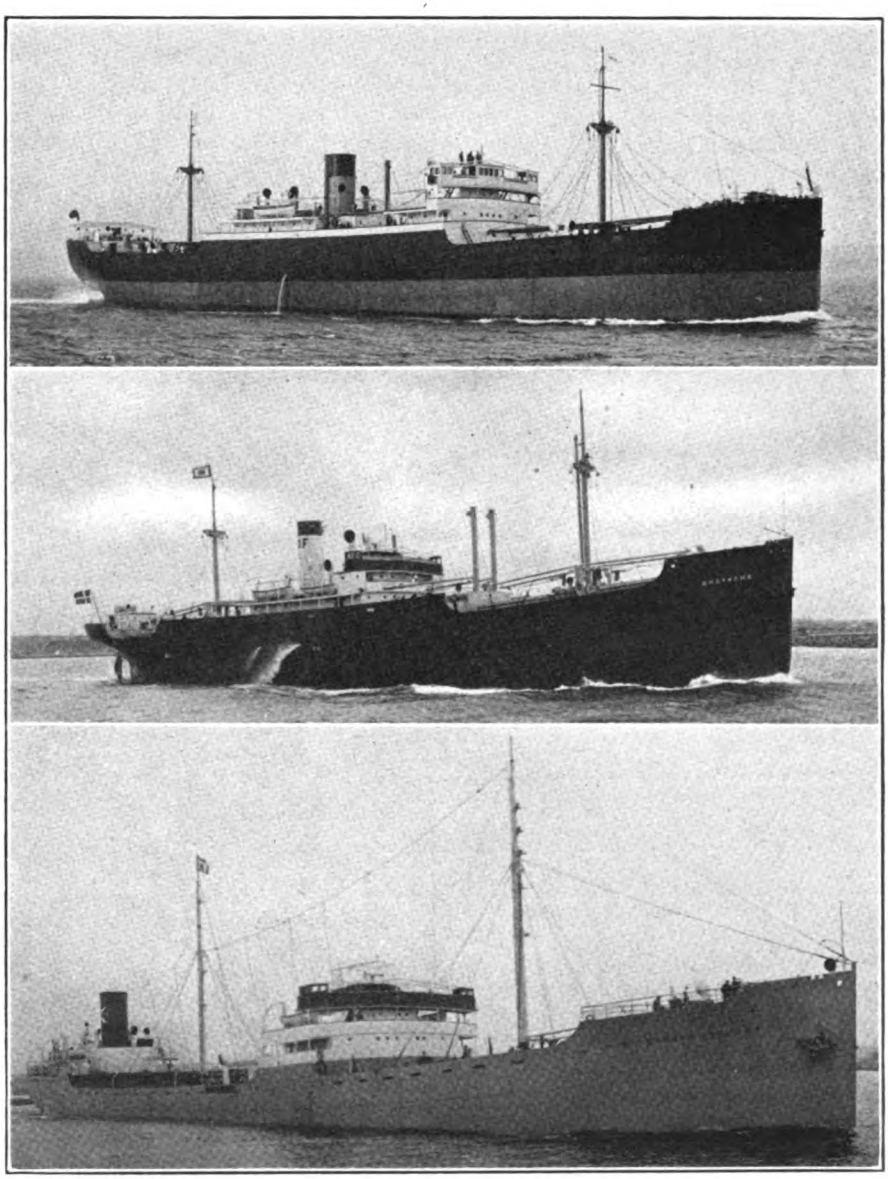
A HIGH class diesel cargo vessel, the KING STEPHEN was built by Harland & Wolff for the King Line Ltd. This vessel is the eighth of nine diesel cargo ships ordered by the owner from the same shipyard. She has a straight stem and cruiser stern and her principle dimensions are: Length between perpendiculars, 400 feet; beam molded, 54 feet 6 inches; depth molded, 34 feet 8 inches. Her gross tonnage is 5280. The propelling machinery consists of one Harland & Wolff B & W, six-cylinder, four-cycle, single acting diesel engine.

M. T. Sir Osborn Holmden

A TWIN screw diesel tanker SIR OSBORN HOLMDEN, was built by Burmeister & Wain for A. F. Klabeness & Co., Oslo, Norway for carrying oil in bulk. The hull is built on the Isherwood bracketless system and the principal dimensions are: Length overall, 488 feet 6 inches; length between perpendiculars, 470 feet; beam molded, 64 feet 2 inches; depth molded to upper deck, 35 feet; load draft, 26 feet 7½ inches; deadweight, 13,400 tons; gross tonnage, 9153. The propelling machinery consists of two sets of six-cylinder, four cycle, single acting Burmeister & Wain latest design, diesel engines, giving a combined output of 4800 indicated horsepower at 145 revolutions per minute. The total carrying capacity of bunker oil for her own propulsion is 1020 tons.

The hull is divided into center and side tanks. The total cargo capacity is about 631,700 cubic feet. All of the auxiliaries in the engine room are electrically driven while the deck machinery is steam driven. There are two diesel engine generating sets each of 100 brake horsepower at 400 revolutions per minute directly coupled to a 66-kilowatt dynamo and auxiliary compressor.

The trial trip was held on May 15 in the Sound at Copenhagen. A speed of 12.12 knots was obtained with the main engines developing a total of 4883 indicated horsepower at 145 revolutions per minute. A fuel consumption test over a period of five hours showed a consumption of 136.7 grams per indicated horsepower hour.



Upper—King Stephen, Single Screw Diesel Cargo Vessel. Middle—Bretagne, Single Screw Diesel Cargo Vessel. Lower—Sir Osborn Holmden, Twin Screw Diesel Tanker

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Cut Lake Freighters' Fuel Bill

Geared Turbine Drive Shows Large Saving Over Customary Reciprocating Engine—Turbine Machinery of Proved Reliability and Sturdiness in Service

By Carl J. Lamb

DURING the past several years, engineers have been making studies with reference to the use of geared turbines for propelling Great Lakes bulk freighters. These studies have brought out a number of interesting facts, which are best presented in the form of a comparison between a geared turbine installation and a reciprocating engine installation on what is known as class "A" freighter, which means one of the comparatively modern vessels, 600 feet or over in length. Only gross results are given in this article, to avoid a confusing complication of figures, but detailed calculations are available to those desiring them.

The reciprocating engine installation selected is of 2200 indicated horsepower, with hand fired scotch boilers and jet condenser, and operates on 180 pounds gage pressure, no superheat, and 23 inches of vacuum.

The geared turbine installation is of 2000 shaft-horsepower, has mechanically stoked watertube boilers and surface condenser, and operates on 285 pounds gage pressure, 130 degrees superheat, and 28 inches of vacuum.

Weight and Space Compared

In the reciprocating engine installation, the total weight of boilers (wet), engines, thrust bearing, condenser (wet), fuel and lubricating oil, is 954,000 pounds. In the turbine installation, the total weight of boilers (wet), turbines, gears, thrust bearing, stoker, condenser (wet), fuel, lubricating oil and air heaters is 409,600 pounds.

Thus the net saving in weight due to the use of geared turbines is 272 tons, thus increasing carrying capacity.

The space requirements are the same for both installations. The engine room for the geared turbine installation need not be longer than that for the reciprocating engine.

Figuring coal at $5.25 per ton for the hand-fired reciprocating engined vessel, and at $4.25 a ton for the stoker fired geared turbine ship, the fuel saved by the geared turbine propelled vessel would amount to $17,600 per season of 26 trips of 150 hours each. The comparison is detailed in Tables I and II.

Lubrication and Maintenance Compared

The lubricating oil consumed by the reciprocating engine installation is estimated at $600 a season for all purposes; that for the geared turbine installation should not exceed $250.

In general, the maintenance and personnel expense for the two installations will be the same; but the use of mechanical stokers reduces the fireroom crew to three firemen and three coal passers, a saving of three firemen at a total of $360 per month for wages and subsistence.

The geared turbine installation shows a saving in weight of 272 tons of machinery and 100 tons of $1.00 per ton cheaper coal per trip; so that the vessel has an additional cargo capacity of 372 tons. Valuing this at $.60 a ton, the extra earning capacity amounts to $223 per trip, or $5798 per season of 26 trips.

According to estimates which are in favor of the reciprocating engine, the first cost of the turbine installation, complete as outlined, adds $55,000 more to the cost of the ship than does the reciprocating engine.

The geared turbine will show the economies noted in Table II as compared with the reciprocating engine in a season of 26 trips. In other words, the geared turbine installation will wipe out its extra cost in approximately three seasons.

TABLE I

The Two Types Compared for Fuel Economy

	Reciprocating engine	Geared turbine
Water rate, for all purposes, in pounds per S. H. P. per hour	15½	9½
Boiler efficiency in per cent	66	82
Coal consumed, per S. H. P. per hour for all purposes (14,000 B.t.u per pound) pounds	1.9	1.2
Coal consumed per 150-hour trip in tons	300	200

Reliability Proved in Service

Records are available of nearly 100 geared turbine propelled ocean going vessels which have been in regular service for periods of from 5 to 13 years, and these records show that the modern geared turbine is quite as reliable as any other type of marine propulsion. A few excerpts from these records follow:

The S. S. MAUI of 10,000 shaft horsepower, with twin screw cross-compound turbines, located in an after engine room went into service in 1915. She has had over 800,000 miles at sea and made 12 trips as a navy transport during the war. She was not late arriving or departing on schedule voyages during the last calendar year. Steam conditions are 225 pounds, 50 degrees, 28.5 inches of vacuum. As a result of the performance of this vessel, the Matson Navigation Co. has acquired ten other ships with geared turbine machinery built by the same manufacturer.

The Inter-Island Steam Navigation Co. has just placed in service the S. S. WAIALEALE with two 2000 shaft horsepower complete expansion double reduction gear units.

The S. S. ALGIC of 3000 shaft horsepower has a single screw, cross-compound, single case, double reduction gear unit located in a midship engine room. She went into service in 1920 and has had 420,000 miles at sea. The water rate is 11.25 pounds per shaft horsepower per hour. Steam conditions are 185 pounds, 50 degrees, and 28 inches of vacuum. She has been on the United States shipping board fuel conservation roll of honor every voyage except one, and received honorable mention that voyage.

The S. S. ALA is a duplicate of the ALGIC, the steam conditions and water rates being the same. She went into service in 1920, and has had 380,000 miles at sea. On May 13, 1927, our records showed that the vessel had run 266,300 miles with no repairs of any nature to propelling machinery.

The S. S. BETA is a single screw

This article was prepared for MARINE REVIEW by Carl J. Lamb, marine engineer with the Westinghouse Electric & Mfg. Co., South Philadelphia Works, Philadelphia.

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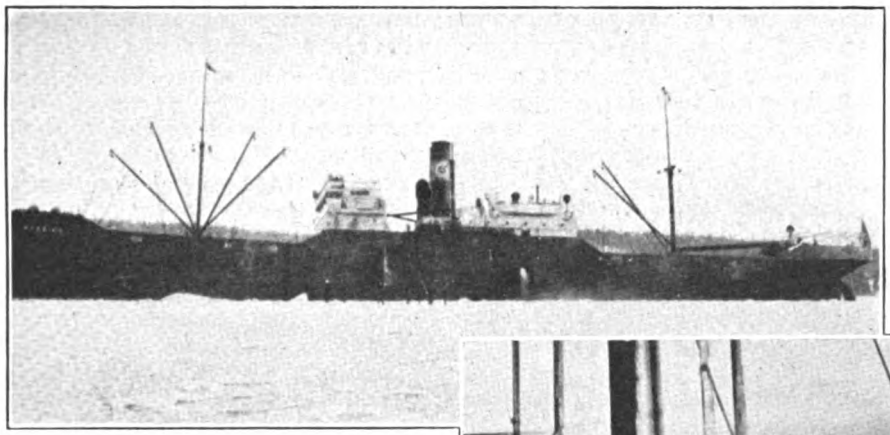


S. S. Massick, Geared Turbine Freighter, making her way to Kramfors, Sweden, through 8 inches of fresh water ice

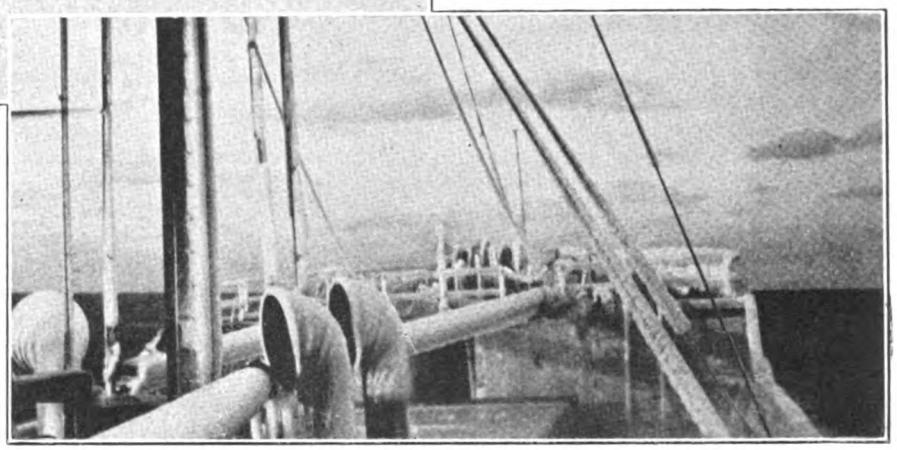
tanker with an after engine room. She is fitted with 2900 shaft horsepower cross-compound turbines, double reduction gears and went into service in 1917, since which time she has logged 250,000 sea miles. The water rate is 11.5 pounds per shaft horsepower per hour. Steam conditions are 180 pounds, 0 degrees, 28.5 inches of vacuum.

The S. S. PUEBLO has a single screw, complete expansion double reduction gear turbine unit of 1800 shaft horsepower and went into service in 1920. She has made over 380,000 miles at sea. The water rate is 12.4 pounds per shaft horsepower per hour. Steam conditions are 200 pounds, 0 degrees, 28 inches of vacuum.

The Japanese S. S. TOHSEI MARU of 3000 shaft horsepower has a single screw, cross-compound, single case, double reduction gear unit. The machinery was shipped in 1920 and remained in a warehouse until after the recent Japanese earthquake. The turbine, gears and the condenser were installed, instead of a reciprocating engine damaged during the earthquake by native mechanics without Westinghouse supervision, drawings, installation or operating instructions. The steamer has operated since then until the present time, very satisfactory, and has logged over 100,000 sea miles. The water rate is 10.35 pounds per shaft horsepower. Steam conditions are 200 pounds, 120 degrees, 28 inches of vacuum.

Foreign Tanker Gives Good Service

The Norwegian S. S. FRANGO is a tanker having machinery which is duplicate of that on the S. S. BETA and with the same operating conditions. She has made 400,000 miles at sea since 1917.



Forward Deck of the S. S. Massick in Winter. No damage to her machinery and equipment resulted in severe weather

TABLE II

Annual Savings Earned With Turbine Ship

Coal	$17,600.00
Lubricating oil	350.00
Crew (7½ months)	2,700.00
Additional cargo capacity	5,798.00
	$26,448.00
Less interest on extra cost of $55,000 at 15 per cent	8,250.00
Total savings per season	**$18,198.00**

It will be noted that geared turbines, both complete expansion and cross-compound, having in some cases single and in others double reduction gears, have been applied to a considerable number of vessels where the engine rooms are aft, just as are the engine rooms of the Great Lakes bulk carriers. So far, nothing has developed to cause either the operators or manufacturers of the machinery to believe that such machinery, located in after engine rooms, is any more liable to misalignment, susceptible to higher maintenance, or any less reliable, than is the reciprocating engine, or any other form of machinery, located in midship's engine rooms.

New York Port Leadership Threatened

Unless Constructive Port Plan Is Energetically Pursued

THAT New York business men are preparing themselves for practical self-defense in maintaining the trade supremacy of the "New World's gateway" is emphasized not only by the number but by the conspicuous character of the commercial organizations which, this summer, are personally surveying the physical facilities of New York's port area. It is estimated that more than a thousand of the city's leading figures in finance and trade actually have made the water tour of the docks, terminals, shipyards, salvage stations and anchorages since early June and there now is believed to be a wider general understanding of the stupendous problems involved than ever before.

The latest of these great civic organizations to take the survey voyage is the New York board of trade and transportation, more than 100 members of which on Aug. 9 boarded the Merritt-Chapman & Scott Corp.'s S. S. GENERAL and toured the high spots of the North river, on both shores, the Staten Island and Brooklyn waterfronts and the older section of the East river. W. J. L. Banham, president of this organization, who long has studied New York's handling of its goods and passengers from the economic angles, comments pointedly on the features observed.

"The vast volume of our city's water-borne commerce, now greater

An analysis of the needs of port development at New York by W. J. L. Banham, president of the New York Board of Trade & Transportation, submitted by Robert D. MacMillen, 220 Broadway, New York City.

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than fifteen billion dollars a year, finds in this port natural and economic advantages which are unmatched anywhere in the world. Not only is there no congestion now but there is ample space available for the handling of many times the present volume. There is little to be gained from a review of those of our facilities which have been brought to a high state of efficiency; much good may result from a dispassionate survey of the backward elements which hamper our legitimate growth and development. Dock, pier and warehouse improvement is one of the greatest challenges facing the constructive genius of the city today," continued this authority. "In many respects it transcends even street congestion as a major civic problem, for upon the effectiveness of our solution depends the continuing employment of our labor, the maintenance of property values, and our very existence as the leading port of the world. The threat to our leadership comes not so much from abroad, though there are several cities there which have displayed greater energy in developing their port resources than have we. The real menace lies in the snail's pace we have set in our efforts and the startling speed with which other ports in this country are creating competitive facilities.

"Happily, the old political-lease system, under which our riparian rights for so long were bartered away for small change, now has fallen into a decay almost as great as the obsolete piers which it created. Many of the worst of these piratical old arrangements have ceased to exist, either through lapse or through the efforts of the authorities, but the fine modern piers erected by the city on some of these immensely valuable sites still are so few in number as but to emphasize the great scope of the task yet to be accomplished.

"Adequate pier rentals, of course, are essential to development, and the authorities have shown commendable sagacity in this respect when the opportunity has offered; but there is another essential, even more important, and that is adequate employment of pier facilities. The time undoubtedly will come when no steamship or railroad interest will be permitted to occupy for its exclusive use any pier or dockage facilities which it does not put to maximum use. These facilities are among the most important of the city's possessions and their diversion to private control only can be justified when they are adequately employed in the public interest.

"When this viewpoint gains wider currency, as it will, our economic basis will be far sounder and there will be such port development as will fully recognize both our opportunities and the responsibilities of our leadership. There is no reason why it should not be possible to service the largest vessels afloat and turn them around in 48 hours, instead of dragging the process out sometimes for a week, but there can be no such accomplishment until there first is a radical renovation of plant. Such a renovation will scrap the uneconomic, unsightly and unsafe wooden piers and replace them with enduring concrete and steel. It will provide warehouses of such scope and character as will permit the complete assembly of outbound cargo before the vessel is berthed, and it will equip these warehouses with such trucking and other devices as will insure speedy delivery at the vessel's side.

"That this modern trend is a newer thought to us than to other ports must be apparent to any business man who inspects developments at other centers. The cities of Philadelphia, Baltimore, Boston, Norfolk, Galveston, Houston, to mention only a few, are pouring literally scores of millions into the process of improvement which we too must follow and, from this time forth, we shall have to watch closely and act energetically to see that the initiative is not utterly taken from us.

"The cost of doing business in New York city is high. It necessarily is high. But the vast volume of trade which it is possible for our merchants to attain brings the unit cost burden so low, both for buyer and seller, that the handicap becomes relatively insignificant. If New York is to retain this favorable balance of volume, however, it must not for a single moment neglect its competitive fences, of which the greatest is transportation. It will be a fortunate day for the city, and for shipping interests as well, when every business man and civic authority realizes that there can be no good business without good transportation and no good transportation without good terminals," Mr. Banham concluded.

Launch Europa, Bremen

THE biggest shipbuilding event which has taken place in Germany since the launching of the MAJESTIC, then known as the BISMARCK, took place on two successive days, Aug. 15 and 16, respectively at Hamburg and Bremen in the launching of the two North German Lloyd super liners, the S. S. EUROPA and the S. S. BREMEN. On another page is illustrated the EUROPA shortly before her launching. There are two reasons for the great importance of this event. One is the anticipated speed of these liners which it is believed will be 27½ knots, the other is their great size, measuring as they do 938 feet in length over all with a displacement of 46,000 tons each. These two facts combined with a lavish expenditure of money to make the interior as rich and luxurious as the mechanical and artistic skill of German handicraft is capable of, makes this launching an event of unusual importance. The acknowledged object of these superships is to bring back to German shipping, through their speed and luxury, that fashionable and wealthy class of travelers which in the days before the war were prone to sail on German ships. An account of the launching stated that 100,000 people were massed about the shipyard as the launching ceremonies were being conducted.

The EUROPA was launched at Hamburg and Dr. Jacob Schurman the American ambassador to Germany presided over the ceremony. The ambassador pointed out that nothing in the history of the world in time of peace matched in swiftness and magnitude the building of this giant liner and he expressed the wish that good fortune might always attend the ship and that she may aid in uniting the two peoples in profitable commerce and good understanding and fellowship. Ines Glaessell, daughter of the vice president of the board of directors pressed the electric button, releasing a bottle of champagne and the vessel slid down the ways.

The launching at Bremen on Aug. 16 of the S. E. BREMEN sister ship of the EUROPA was if anything even more impressive as the ceremony was conducted by President Von Hindenburg. He hailed the building of the BREMEN as a manifestation of the indestructible German capacity for work. The launching was celebrated as a great patriotic event. There is no question but what this significant event marks the turning point in the complete recovery of the German merchant marine.

Delivery of the EUROPA is expected

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in April next year. She is to reach New York towards the end of April. The BREMEN it is expected will arrive two weeks later. Very little is known about the details of construction. Each vessel is equipped with four propellers driven by geared turbines. The voyage from Bremen to New York will be made in six days and from the Channel ports in five days. Including the crew each vessel can carry 3200 persons. One of the recent reports stated that the new liners are being built with more emphasis on luxury than on speed. However, earlier reports stated a speed of 27½ knots which if it materializes is easily two knots better than the present fastest transatlantic ship, the MAURETANIA.

The Ulster Iron Works, with headquarters at 52 Vanderbilt avenue, New York City, and plant at Dover, N. J.' has added to its line of products a full assortment of wrought iron rivets for ship work.

Business Taken Over

J. Thos. Rhamstine, manufacturer of electric apparatus, Detroit, Mich. has taken over the business of the American Strombos Co. and will from now on manufacture all types of Strombos horns and equipment at the plant in Detroit.

This company now controls the patents on air diaphram horns in the United States. It anticipates expanding the field of use for these units and adding various types to the regular line from time to time.

Yacht Orders Placed

The Bath Iron Works has received an order through Henry J. Gielow Inc. for a $1,000,000 cruising yacht. This vessel will be 262 feet in length and represents a considerable shipbuilding feat that will mean an increase of operations in the Maine shipyard. At the same time three other boats will be built in the United States under the supervision of the same naval architects. The four vessels altogether will total in cost $2,650,000. This, it is said is the largest order of its kind ever placed in this country. The larger vessel will be fitted with two, 1500 shaft horsepower bessemer diesel engines and two bessemer 50-kilowatt diesel engines generating sets. The others will also have bessemer diesel engines it is understood.

George M. Marr, for the past nine years with Chas. Cory & Son Inc., New York City, and recently marine sales manager for that corporation, has resigned and accepted a position with the Fyre-Freez Corp. as director of engineers and sales, department of fire protection systems. and systems of smoke detection.

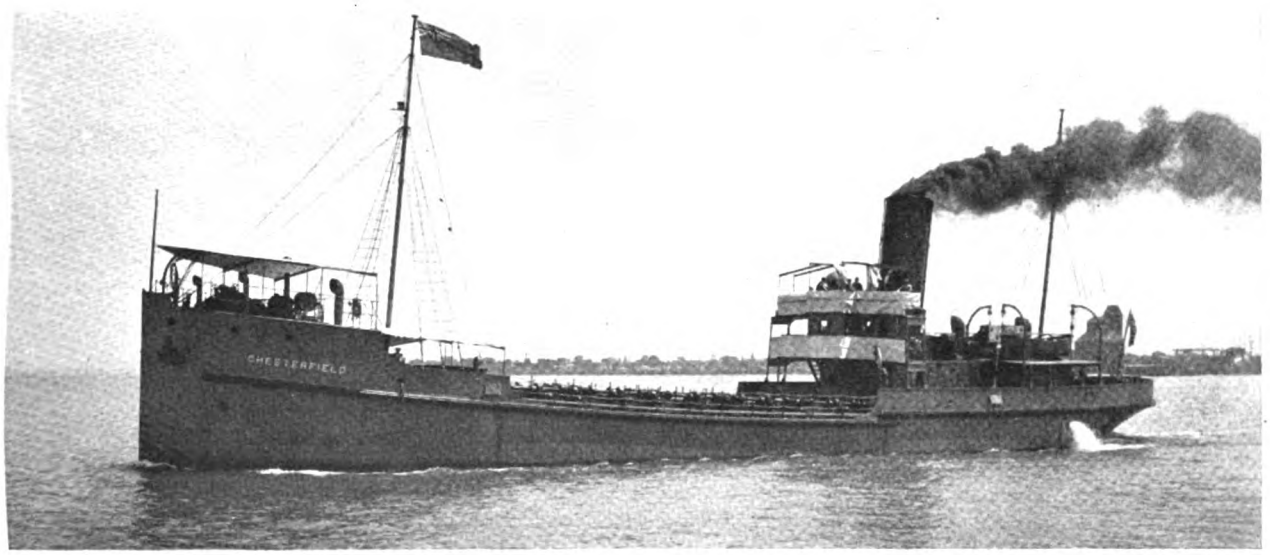
Canadian Hopper Barge Completed

THE self-propelled hopper barge, CHESTERFIELD, illustrated herewith, built by the Collingwood Shipyards Ltd., Collingwood, Ont., to the order of the Canadian government's department of railways and canals, ran successful sea trials on July 24. The vessel was delivered on July 27, eleven days ahead of the contract date. The order for this vessel was received Feb. 29; the keel was laid on March 21 and the launching took place June 30. The trials were witnessed by D. W. McLachlan and Captain Mack on behalf of the department of railways and canals.

The CHESTERFIELD is 187 feet in length overall; 180 feet in length between perpendiculars; 32 feet in molded breadth; and 14 feet 6 inches in molded depth. She is fitted with a set of triple expansion, surface condensing engines having cylinders 15½x76x44 inches in diameter and 26 inches in stroke. Steam is supplied by two scotch type boilers 12 feet 6 inches in diameter by 11 feet long.

Bulkheads divide the hopper compartment into five spaces transversely. Ten hinged doors are fitted for the discharge of the spoil. These doors are operated by means of mechanical operating gear.

Roomy, well ventilated quarters are provided for the crew forward. The vessel was constructed to the rules and regulations of Canadian steamship inspection and the highest class for her type in Lloyd's register of shipping. The accompanying illustration shows the CHESTERFIELD on her trial trip, July 24 on Lake Ontario. The Collingwood Shipyards Ltd. is one of the best equipped and most important yards in Canada. John S. Leitch is vice president and general manager.



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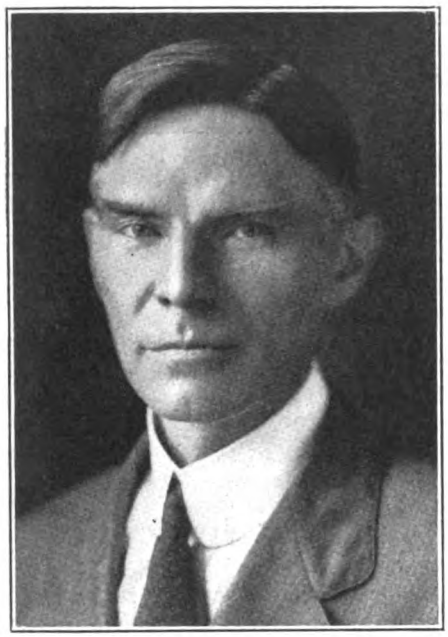
His Inventions Advance Marine Engineering

Henry F. Schmidt, consulting engineer, South Philadelphia works, Westinghouse Electric & Mfg. Co., has been occupied with researches in connection with the design of turbines, pumps, blowers, condensers, air ejectors, diesel engines, turbine governors, and other related subjects, throughout his long association with that company.

He is an inventor of note and has to his credit over a hundred patents covering design and construction used in both power plant and marine machinery and further, he has in the neighborhood of fifty patent applications now pending.

Mr. Schmidt was born in New York



Henry F. Schmidt
Consulting Engineer, Westinghouse Company

city. He attended Columbia university, where he studied marine engineering under the late Prof. W. L. Cathcart. While still a student at the university, he began an independent theoretical investigation of steam turbine designs resulting in a simplified method of predicting turbine performance. This method in modified form, is in use by the Westinghouse company at the present time. After leaving college, he spent several years in turbine test work; as a lecturer in engineering, first at Queen's college, Kingston, Ont., and later at the Michigan Agricultural college; as an associate editor of the *Electric Railway Journal*. He joined the Westinghouse Machine Co. in 1908 as assistant technical writer. Since then he has served in the capacity of turbine engineer, marine engineer, and consultant. He was intimately concerned in the design of the propelling machinery for the U. S. Collier NEPTUNE and later naval vessels, both American and foreign, and for the two hundred odd merchant ships engined by the company during the war period.

Among his most widely known and used patents have been the oil governor and the ejector lubricating system, which mechanisms have given exceptional service on hundreds of turbines and which are now the standard for his company. The review and research necessary to bring the oil governor to its present state of perfection, both for constant-speed land units and for variable-speed marine turbines, formed the foundation for a series of articles recently published, which covers the essential features of fluid governors.

Mr. Schmidt is a member of the United States Naval Institute and of the American Society of Naval Engineers, having received the gold medal and honorary life membership as prize essayist of the latter society for the year 1927 with his paper *Some Screw Propeller Experiments with Particular Reference to Pumps and Blowers*. He makes his headquarters at the South Philadelphia works of the company, where turbines, condensers and auxiliaries are built for both land and marine power plants.

M. S. St. Louis Launched

The motorship ST. LOUIS for the Hamburg American line was launched Aug. 2 at the yards of Bremer Vulkan, Vegesack, Germany, near Bremen. Mrs. Carl F. C. Meyer, wife of former president of the St. Louis, Missouri chamber of commerce and chairman of the delegation from St. Louis who attended the launching ceremonies, christened the new motor vessel. The ST. LOUIS is one of two new motorships being built by the Hamburg American line for its Hamburg New York service and is a 16,000-ton vessel with a speed of 16 knots. There will be two stacks. Accommodations are arranged for 420 passengers in cabin class, 227 in tourists' third cabin and 430 in third class cabins. The new vessel is expected to make her maiden voyage from Hamburg, Dec. 6 and from New York, Dec. 22.

Complete Tanker Trials

The diesel oil tanker, SUN, which was launched at the Sun Shipbuilding & Dry Dock Co., Chester, Pa., July 14, successfully completed her trials in Delaware bay, July 25, and was turned over to the owner. This marks rapid completion of such an important vessel after launching. Her deadweight capacity is 13,486 tons; her length over all is 498 feet and her beam is 68.6 feet and her depth is 37 feet. Capacity in gallons is 5,175,000 on a draft of 27 feet 2 inches. The vessel is driven by twin screws, the engines being of 2800 horsepower each of the Sun-Doxford opposed piston type diesel.

Admiral Eberle Retires

Having reached the navy age limit of 64, Rear Admiral E. W. Eberle, ranking officer of the navy by seniority and as chairman of the navy general board, retired from active duty, Aug. 16.

Admiral Eberle has had a notable career. He joined the navy 47 years ago at the age of 17, when he was appointed a midshipman at the Naval academy. He graduated in 1885. In 1898 he was a lieutenant on the battleship OREGON in her voyage around the Horn, and at the battle of San Diego he was in charge of her forward turret. In 1911 he organized and was commander of the first Atlantic torpedo fleet. During the World war he was superintendent of the naval academy and he organized and was first commander in chief of the battle fleet. He served as chief of naval operations for more than four years.

In his long career he has seen service with ships of all types, both sail and steam and all over the world. He was born at Denton, Texas, Aug. 17, 1864, his family coming from Fort Smith, Ark., to which place they returned shortly after his birth, and where Admiral Eberle has maintained his official residence ever since. He is a member of the Society of Foreign Wars, Military Order of the World War, Army and Navy club, New York Yacht club, and Chevy Chase club of Washington.

Test Fire Apparatus

The Fyre-Freez Corp., manufacturer of CO_2 fire extinguishers, held a special demonstration of a new system of smoke detection used in conjunction with a means of freezing fire, for the benefit of the United States steamboat inspection service at the plant of the General Carbonic Co., Long Island City, N. Y., Aug. 16. The demonstration was attended by the Inspector General Dickerson N. Hoover; Capt. Nils B. Nelson and John L. Crone, who are supervising inspectors of the ninth district, Cleveland, and second district, New York.

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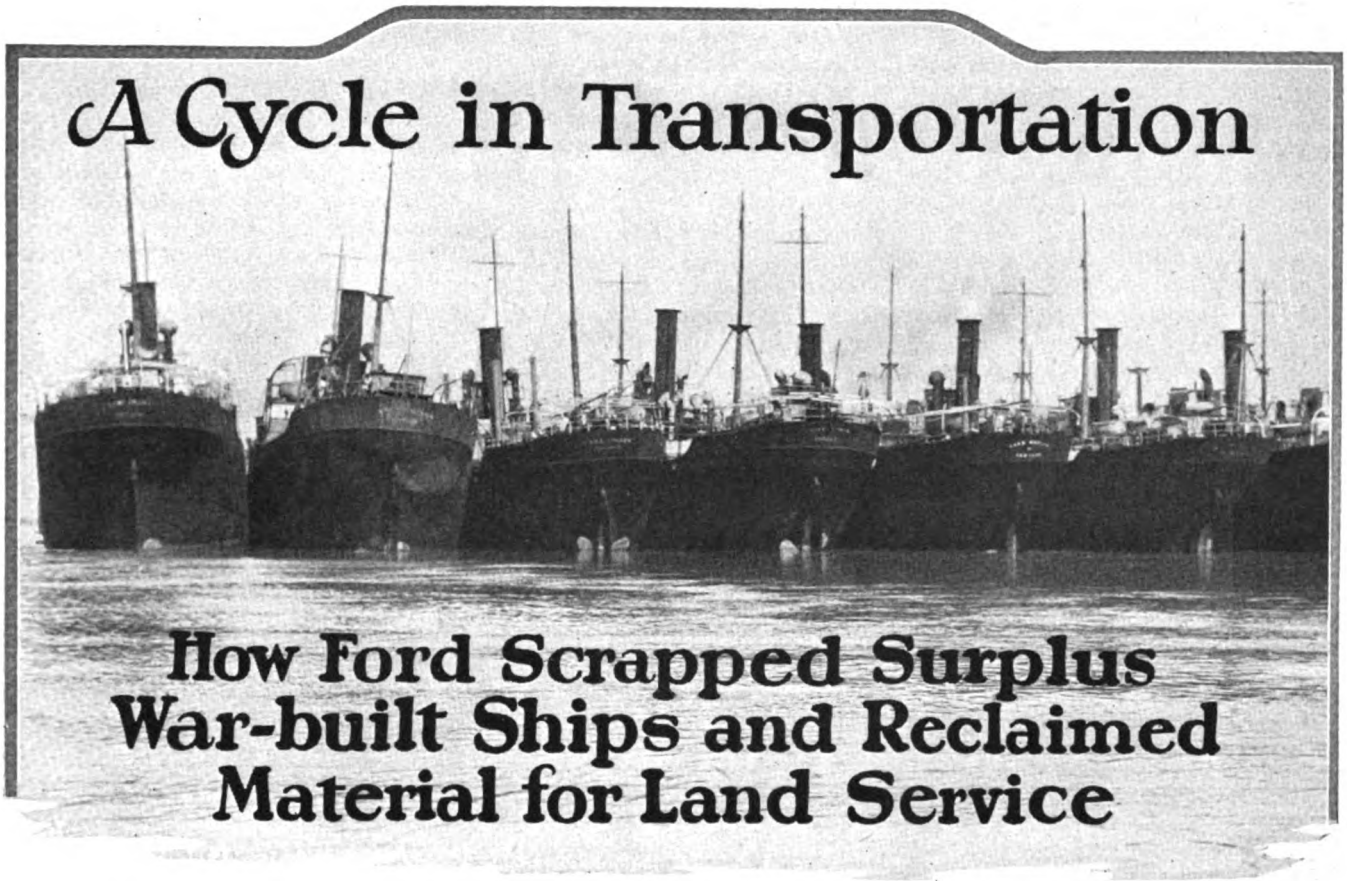
A Cycle in Transportation



How Ford Scrapped Surplus War-built Ships and Reclaimed Material for Land Service

Part II—Test Ship for Scrapping Rides Out Winter Storms

IN THIS, the second installment of the serial written by the Ford Motor Co. describing the epochal scrapping of 199 surplus shipping board vessels, is told the difficulties of towing the Lake Fondulac from Kearny, N. J., to Detroit under severe late fall weather conditions in storms and through restricted waters.

THE barometer was low and the sky was overcast when the tug BALLCAMP left the Ford Motor Co. dock at Kearny, N. J., with the LAKE FONDULAC in tow. It was 7:30 a.m., Nov. 15, 1925. A strong southwesterly wind was blowing. Both boats were rolling heavily when Ambrose Light was passed at 5:15 p.m.

During the night the wind increased into a moderate gale. Abeam seas combed the tug, flooding the radio room and officers' quarters and putting the radio apparatus and the electric systems out of commission. Coal shifted in the BALLCAMP'S bunkers giving it a list which added to the difficulties. The LANE FONDULAC, riding high though she was, also shipped water.

A heavy rain began to fall Monday morning. The storm continued throughout the day and shortly after midnight the ships sought shelter in Vineyard Haven. There they lay over for more than 24 hours. It was discovered that the 10-inch hawser had kinked and become frayed during the storm and part of it had to be cut away. By Wednesday afternoon the weather had cleared and the ships proceeded up the coast with a bright sky and a light wind. The radio apparatus, after being dried, was found usable; but the tug's electric system remained out of commission.

Late the following afternoon the vessels put into Portland. The LAKE FONDULAC anchored in the harbor while the tug proceeded to a coal dock to take on additional fuel supplies. Its electric system was also repaired, and both ships received necessary stores.

On Saturday a new 12-inch hawser was put out to replace the damaged 10-inch one, and shortly after noon the vessels went out to sea again. Clear weather held for little more than a day. Snow greeted the ships as they rounded Cape Sable and a southeasterly wind brought rough seas.

South of Halifax Monday night the BALLCAMP received warning that a 56-mile gale was on the way. This was serious because against the strong blow the tug would have difficulty keeping the LAKE FONDULAC from piling up on Sambro Bank. Snow was pelting and the visibility was poor. Only during occasional lulls could either tug or barge see each other. The night was bitterly cold. Shortly after midnight it was decided to ride out the storm at anchor. The seas pitched the ships badly, but did no serious damage, and at 8 a. m., Tuesday, the BALLCAMP received word from Sambro Island radio station that the center of the storm had passed. Anchors were heaved up and the ships again got under way. Throughout the day the weather was fairly rough but by midnight it had cleared.

Fortune smiled on the ships Wednesday morning. The weather was excellent when they entered the Gut of Ganso, and they negotiated that difficult strait without trouble. By

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9 p.m. the boats had passed through St. George bay and were abreast of Cape George. But there a strong outgoing tide running nearly nine miles an hour caught them. Not till next morning when the tide had turned were the ships able to pass the point of the cape and proceed on into Northumberland strait. Soon they were abeam Pictou. A strong wind made the sea choppy but the vessels were fairly well sheltered by Prince Edward Island.

Once out of Northumberland strait new difficulties were encountered. Winter had set in and few vessels were attempting to navigate. Ice floes were encountered off Cape Gaspe early Saturday morning.

The crisis of the trip came above Matane, near where the St. Lawrence river merges with the Gulf of St. Lawrence. Tremendous seas were running. Blinding snows swirled about the ships. The thermometer had dropped far below zero. Ice had gathered on the rigging of the BALLCAMP. Much of the tug's supply of coal had been used, and this loss of ballast, coupled with the frozen decks and rigging, made it topheavy and unwieldly.

Waves rolled in from the Gulf of St. Lawrence and, meeting the river current, boiled into a turbulent mass. The little tug was tossed about as though it were a cork.

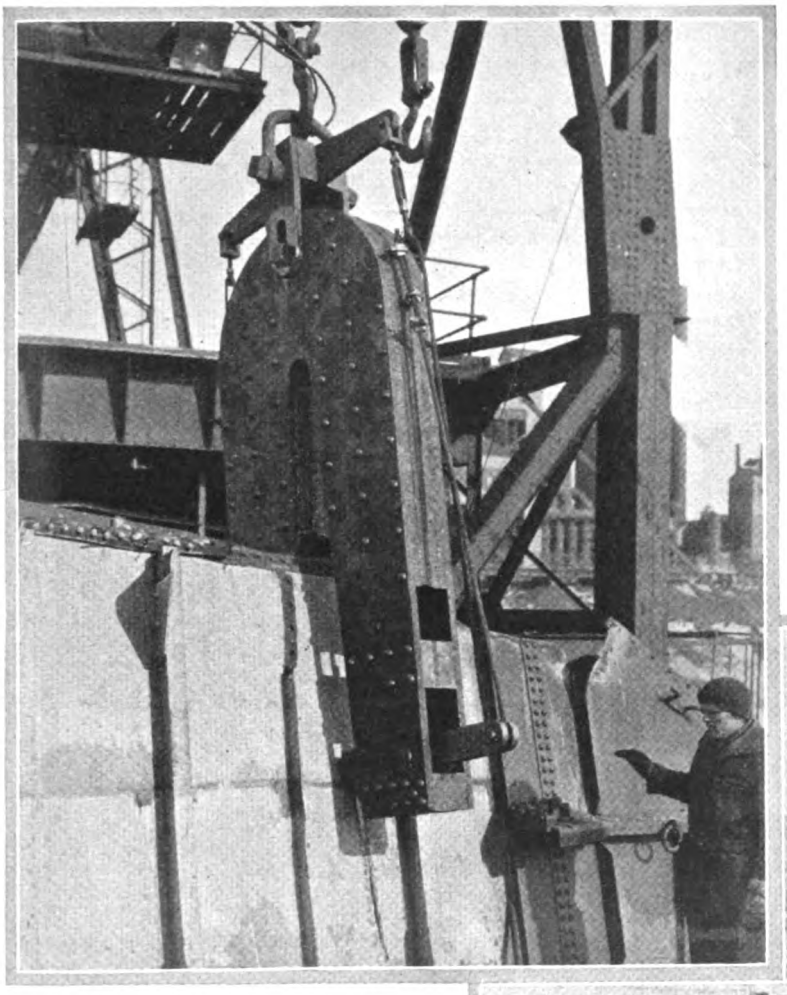
The climax came with four giant waves which swept completely over the BALLCAMP. Three times the tug rallied from the blows. Then came the fourth, heavier than the others. The BALLCAMP trembled while one could count ten; then rallied and righted itself. The waves had proved a blessing in disguise. The salt water, sweeping over the vessel, loosened the ice and swept the decks and riggings clear. After that the ships rode easier and the danger was past.

The first river pilot was picked up early Monday morning, Nov. 30, at Father Point, Que. The St. Lawrence river was well sprinkled with floating ice but in spite of this fairly good time was made throughout the morning. In the early afternoon the ice thickened and at 8 o'clock it closed in on the BALLCAMP, holding it in a vise-like grip. For half an hour the tug battled before being able to free itself.

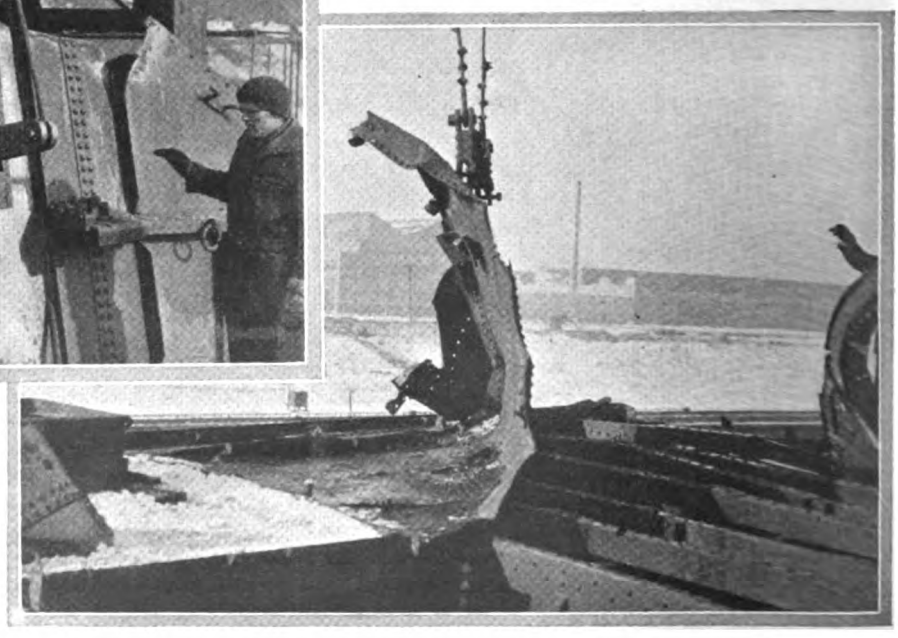
Once in clear water the LAKE FONDULAC dropped anchor to await flood tide. Heavy ice continued to drift downstream and the tug remained fast to the tow line to the lee of the LAKE FONDULAC. Shortly after 1 a.m. the ships were ready to proceed again but the tow hawser parted. Another line was put out and the tug towed the barge into Murray Bay (Point au Pic) making fast to the pier. The temperature was 20 degrees below zero.

It was apparant that the BALLCAMP could not battle its way up the St. Lawrence river without help. Ice in the river was 8 and 10 inches thick; it gave indications of congealing at any moment. Arrangements were therefore made with the Canadian government for the aid of the tug, LORD STRATHCONA, a 2000-horsepower icebreaker.

At 5 in the morning of Dec. 2 the LORD STRATHACONA ran a tow line to the LAKE FONDULAC and proceeded



PEELING deck plates off the LAKE FONDULAC *with a crane and falls. This method was found to leave too many jagged edges and tore off sections difficult to charge in the open-hearth furnaces*



THIS ingenious roller cutter or shear sliced the steel sides of ships as though they were so much butter

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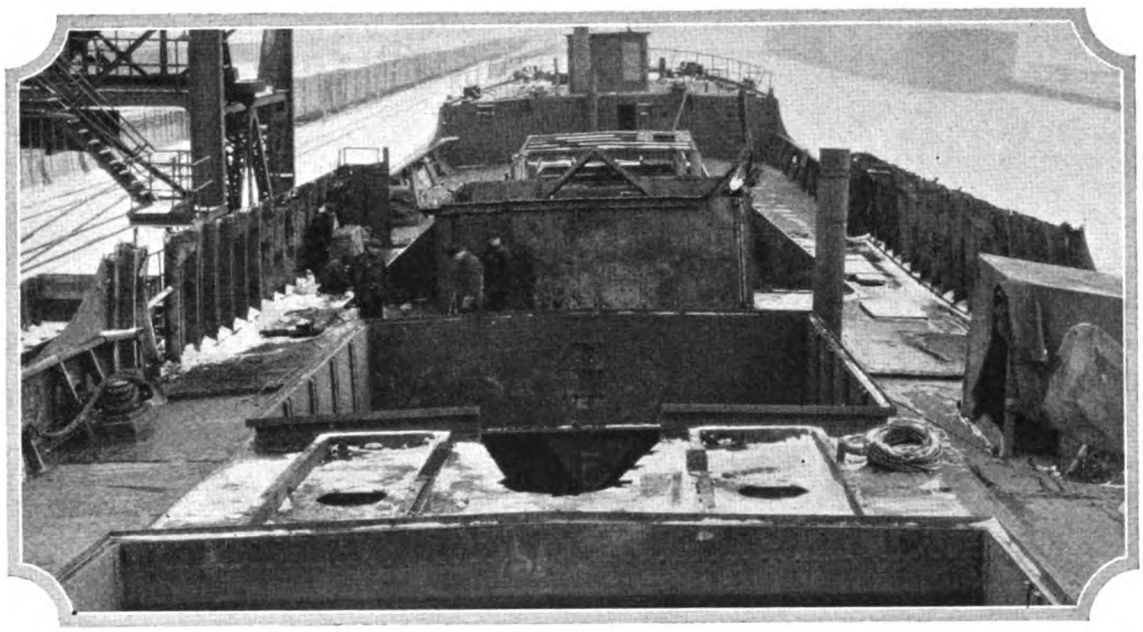

LAKE FONDULAC, *test scrapping ship, with midships removed, permitting boilers and engines to be lifted out*

upstream. The BALLCAMP was tied alongside the afterquarter of the barge. Thus it could aid with the towing, or, by reversing, held the LAKE FONDULAC in check whenever the Lord STRATHCONA was slowed down by the ice. Otherwise the barge running free might have crashed into the icebreaker and split her from stem to stern.

Heavy ice was encountered during the entire trip to Quebec, the ships arriving in the outer harbor at 6:40 p.m. The next day they lay over while the BALLCAMP took on coal and water, and at 2:40 on the morning of Dec. 4 they cast off for Montreal. Once more the LORD STRATHCONA was in the lead, the BALLCAMP fast to the LAKE FONDULAC'S afterquarter.

The greatest battle against the ice took place at Quebec bridge five miles above the city. Eight ships were imprisoned there, caught in the terrific ice jam piled against the bridge piers both by the downstream current and the upstream tide. In some places the ice mounted 18 feet around the bridge abutments.

Three times the LORD STRATHCONA rammed the ice with all its might before it finally broke through. Its efforts released the eight other ships and these gratefully followed in its wake all the way to Montreal. Good time was made after leaving Quebec bridge and the ships tied up in Montreal harbor shortly after midnight.

At Montreal the first of the canals, the Lachine, was encountered. Ice was forming rapidly in the waterways, but was kept from congealing by frequent opening of the lock gates. This changed the water level and broke the ice into cakes. These cakes, however, were half a foot and more thick and gave much trouble. The tug RIVAL was engaged to take the LAKE FONDULAC through the St. Lawrence canals to American waters, and a canal crew of five men and captain was hired.

It took more than 24 hours to pass through the Lachine canal, a distance of eight and one-half miles. The locks fitted the LAKE FONDULAC like a tight glove. Once in, the ship displaced the ice cakes which clustered about the lock gates making it almost impossible to close them. The gates in turn froze together as soon as they were shut, and it was necessary to saw through the ice to open them again.

Another 24 hours passed in clearing the Sculanges canal. In the Cornwall canal fast water added to the difficulties. No attempt was made to proceed in the canals at night. Then came the Farran's Point, Rapid Plat and Galops canals. It was Dec. 10 before the ships reached Ogdensburg.

Delay of another day would have been disastrous. The tug RIVAL after delivering the LAKE FONDULAC to Ogdensburg raced back toward Montreal. Its haste ended in failure. Near Coteau Landing it was caught in the ice, and forced to spend the winter there.

A day was spent at Ogdensburg taking on coal and supplies and making arrangements for the rest of the trip. The morning of Dec. 11 the vessels proceeded up the river and into Lake Ontario. Heavy weather was encountered on the lake and the ships labored badly. Throughout the night wind and sea increased. Much of the time the propeller blade and rudder of the BALLCAMP were out of water making steering difficult. The intense cold also hampered the men.

The ships rode out the storm, however, and at 7.30 on the night of Dec. 13 dropped anchor off Port Dalhousie at the entrance to the Welland canal. Navigation was officially closed, but special arrangements had been made with the Canadian government to keep the canal open. Two tugs, DORTHY MAY and MABLE MACDONALD, were waiting to help.

The start was made early next morning. The same canaling difficulties encountered earlier, were found, but the boats pushed through relentlessly. Because of the exhausted condition of the men, the ships tied up in the canal the first night, but the next night there was no rest, and at 5:25 on the morning of Dec. 16 the BALLCAMP and LAKE FONDULAC arrived in Port Colborne. An hour later they cast off for the last leg of the journey.

Fine weather greeting them on Lake Erie. Ice was plentiful but it offered little interference. The run across the lake was made without moment and at 6:20 on the evening of Dec. 17 the LAKE FONDULAC tied up in the River Rouge slip at Fordson. The trip had taken just 32 days, 10 hours and 52 minutes. It had been a continuous battle against the elements, but the LAKE FONDULAC had been brought through in time.

Preparations for the major dismantling operation at Fordson were carried on simultaneously with the experimental work on the LAKE FONDULAC. Lessons learned in taking the ship apart were promptly applied in

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the designing of the tools, the establishing of methods and the training of men. Different portions of the ship presented different problems; the superstructure required one type of work, the plumbing another, the bulkheads another, the machinery another.

Mastery of a certain problem did not mean that work on that problem ceased. Nothing was ever considered unchangeable. Ways for doing a thing better were continuously being tried; if the new way proved more efficient than the old, the old was immediately abandoned. This was true not only in scrapping the LAKE FONDULAC but throughout the whole dismantling operation. Methods were constantly being changed and improved.

Work on the LAKE FONDULAC was started the day after the vessel arrived in Fordson. It ended June 15, 1926, when the last ship-bottom section was hauled to the storage yard. Dismantling the LAKE FONDULAC took 180 days. By the end of the summer three ships were being taken apart every five working days.

Many novel experiments were tried on the LAKE FONDULAC. The combined force of cranes and powerful hydraulic rams was first used to rip the deck plates from the beams. The rams exerted pressure from underneath while the crane falls, hooked to a corner of the deck plates, tugged from above. The decks were peeled off easily enough by this method, but the plates were left jagged and distorted, and were difficult to handle later in reducing them to charging-box size.

A special-designed roller cutter or shear was used in slitting the side plates of the LAKE FONDULAC. Suspended from a crane, it was lowered over the edge of the side plates to take its "bite" and pulled upward. After each cut the shear was lowered again until a stop rested against the lower edge of the cut when at once, it was in position for the next bite. The shear was housed in a compact frame which guarded its vulnerable parts against breakage, and its smooth contour prevented it from catching on projections while being handled.

Hook knives attached to the crane falls were also used for slitting the hull side plates vertically. Both the hook knives and roller cutter worked well, but the torch was finally adopted for most of the cutting work.

With the LAKE FONDULAC in the process of dismantling, the plans for building and equipping the special dismantling dock were rapidly carried out. A boat slip already projected from River Rouge turning basin half a mile into the Fordson plant yards. On one side of this was the ore dock, backed by the storage bins, the great blast furnaces, the coke ovens and the cement plant.

Along the other side the new dock, approximately 2200 feet long, was constructed. Space was allotted for ten ships in line. Pipe lines, for gas, oxygen, steam, compressed air and water were buried in trenches along the dock.

Three sets of railroad tracks and a set of widely spaced rails including a third rail for gantry cranes were laid down. Feeder tracks were built to the open-hearth furnaces and to the different storage sectors.

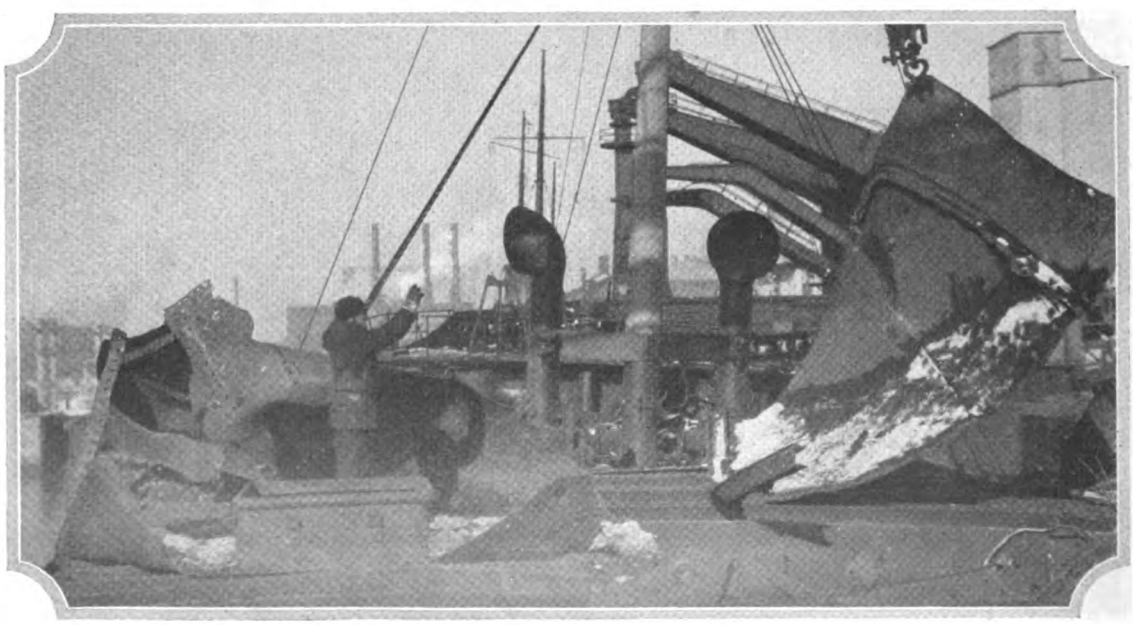
A mammoth locomotive wrecking crane of 200 tons capacity was ordered from the Industrial Works of Bay City, Mich., at a cost of $73,300. It was mounted on two 6-wheel trucks, and was capable of easily lifting an entire engine, weighing 75 tons, or a boiler weighing 50 tons from its foundation in the ship's hold and placing it on a specially built flat car.

The crane was operated by steam. Its weight ready to operate was 366,000 pounds. This necessitated driving 88 piling into the ground and tying them together with concrete for the foundation inway of the dock at the point where the crane operated. Each piling was estimated to hold a load of 25 tons. There was a maximum reaction at the end of the center outrigger, 13 feet from the center of the crane, of 350,000 pounds.

As the crane traveled on standard gage track, it could be moved readily to any part of the plant to unload the boilers and engines from the flat cars and place them in position for storage.

It was designed for the heaviest class of railroad wrecking service and provided the maximum lifting capacity obtainable in the locomotive-type crane. It was equipped with Westinghouse air brakes, telescopic outriggers and was fitted with a boom 50 feet long to the main hoist pin with an 8-foot extension to the auxiliary hoist pin. The lifting capacity with outriggers in place was 200,000 pounds at a 30-foot radius and 160,000 pounds at a 35-foot radius.

Four 60-ton standard gage locomotive-type cranes were ordered from the McMyler-Interstate Co. at a cost of $105,260. Each crane had a 60-foot lattice boom. Air brakes were applied on all eight wheels and there were special combination beam and roller type outriggers. The lifting capacity for a 16-foot radius was 120,000 pounds; for a 25-foot radius, 74,000 pounds; and for a 60-foot



No wonder ship scrapping has been listed as a most harzardous vocation. Ford methods were devised with the safety of workmen paramount

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radius, 20,000 pounds, in each case without outriggers.

Five gantry-type cranes were ordered from the American Brown Boveri Electric Co. at a cost of $8000 apiece. They were 35-ton, 8-wheel, 5-motor, variable radius cranes with main and auxiliary hoists and traveling and rotating superstructure. The capacity was 35 tons at a 20-foot radius and 15 tons at a 55-foot radius, while the auxiliary hoist capacity was three tons.

The cranes were of the customary shipyard type, each equipped with two 85-horsepower 550 revolutions per minute direct-current motors and three 25-horsepower 725 revolutions per minute direct-current motors.

Instead of a marine railway it was decided to have a floating drydock for handling the ships in the final stage of dismemberment. The drydock was built to order by the Great Lakes Engineering Works. Its weight was approximately 500 tons and its lifting capacity was an equal amount.

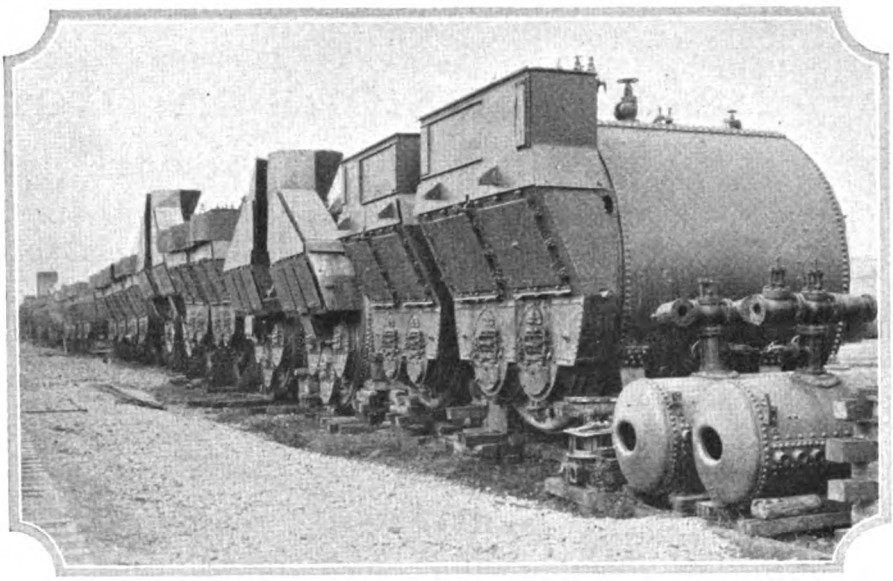
The drydock was built in one section, the length of the pontoon being 250 feet, depth 5 feet, length of side walls 150 feet, width of side walls 5½ feet, and depth of side walls 12½ feet. It was built of 12½-pound steel plate throughout with transverse floors of 14-pound plate every 25 feet.

There were three lines of trussed longitudinals on each side of the center keelson. The framing was on the transverse system and was of 3 x 5 inches by 9.8-pound angles spaced 30 inches. Seven lines of concrete girders ran longitudinally on the deck of the pontoon spaced 6 feet apart; each concrete girder was 17 inches high and 12 inches thick and was for support to the bottom of the vessel when docked.

Four centrifugal pumps were installed in the side walls on one side of the dock, where they could be controlled easily. They were driven through vertical shafts by 5-horsepower motors installed on top of the side walls. The suction side of each pump was connected to a cast-iron header having two 6-inch suction lines leading to the pontoon on each side of the center keelson. The pontoon was divided into 12 water-tight compartments.

Drydock Operated Speedily

An 8-inch filling valve was also connected to each header. There was a 6-inch valve on each 6-inch suction line on the pump discharge and an 8-inch valve on the filling side of the header. The stems of these valves were carried through the depth of the side wall to stands 20 inches high with hand controlled wheels. Connections were provided on headers at each end of the dock for air, gas, oxygen, and electric power.



Many of these marine boilers shown here in stock at Fordson have been put to use in various Ford plants

It took approximately two hours to sink the dock to the 4-foot level, and an hour and a half to raise it with one of the ship bottoms in it. Once the dismantling job was well under way, the drydock was operated with unusual speed. By the time the last ship piece was hoisted off, the dock would be partially submerged and as soon as the new hull bottom appeared out of the water the men would be working on it.

The drydock was so constructed that it might be rebuilt to handle commissioned ships within its capacity, by adding approximately 30 feet in length to the side walls and 10 feet in height.

The first torch cutting on the LAKE FONDULAC was done by the customary oxyacetylene method, bottles of oxygen and acetylene being used. This was unsatisfactory from many angles; cost, uncertainty of supply, awkwardness, etc. Experiments soon resulted in the substitution of coke oven gas for acetylene. This insured a continuous plentiful supply from the company's own coke ovens at a materially lower cost.

An oxygen plant capable of producing 2000 cubic feet of oxygen per hour at a purity of 99.5 per cent was then installed in the 14-inch steel mill building. The manufacture of oxygen consists of extracting oxygen from the air by the liquefaction process, the nitrogen being allowed to evaporate.

The oxygen plant consisted chiefly of the following items: Two steel low-pressure purifying towers; one 4-stage compressor; one steel solution mixing tank; one steel oil separator cylinder with valve; one air drying and purifying battery consisting of eight high-pressure seamless drawn steel cylinders, on steel high-pressure air filter cylinder; one rectifying column constructed of an outer steel shell with spiral copper coils; one thawing coil and steel container; one oxygen meter for a maximum flow of 2500 cubic feet per hour; one gas holder with capacity for 1500 cubic feet of oxygen constructed of 3/16-inch steel braced with 2-inch angles; one high-pressure oxygen compressor to compress 3500 cubic feet of oxygen to 150 atmospheres; one charging manifold of 20 connection with control gage, check valve, shut-off valves and connecting pipes of high pressure copper construction; and the piping, valves, fittings, gages, and safety devices necessary for proper operation.

To reduce the large ship-bottom sections, weighing approximately 10 tons, to charging-box size for the open-hearth furnaces was a problem in itself. Cutting the sections by torch would be slow and expensive. Therefore a 1000-ton steam shear—the largest in the world—was ordered from the Morgan Engineering Co. Five additional shears were ordered for cutting the smaller steel.

The slag disposal dump was near the site of the new dock; this had to be moved.

Roadways were constructed along the dock and through the various storage sectors.

A 10-ton magnet crane was installed in the open-hearth building to handle the furnace scrap. Electric power

(*Continued on Page* 66)

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Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

IF, WHILE collision repairs are in progress, the shipowner avails himself of the time to make other repairs unrelated to the collision, the tortfeasor is not thereby relieved of his liability for demurrage during the full time required to effect collision repairs, unless the other repairs are necessarily made at that time.—Pan-American Petroleum & Transport Co. v. United States, 21 F. (2d) 791.

* * *

THE ship must provide for stevedores a reasonably safe place in which to work, regardless of the fact that their employer is an independent contractor.—ADOUR, 21 F. (2d) 858.

* * *

IT WAS asserted in the case of WILLIAM LEISHEAR, 21 F. (2d) 862, that the question of priority of maritime liens is filled with confusion. "The rules conflict," said the court. "Tort liens generally rank contract liens. Seamen's wage liens are especially favored under the ancient doctrine, that has come down to us, that seamen are in effect wards of the admiralty. So also of salvage, since the law wishes to encourage persons in saving maritime property from destruction. All maritime claims rank all nonmaritime. There is the general rule that maritime liens rank in an order inverse to the order of their creation, a principle contrary to what is common in other branches of law. . . . . Generally speaking, the law of maritime liens may be said to be made up of exceptions to the above doctrine, which gives priority to the lien latest in point of time, so that today it is possible to deduce, from the decisions, the following order of priority, existing irrespective of time, which represents the weight of authority: (1) seamen's wages; (2) salvage; (3) tort and collision liens; (4) repairs, supplies, towage, wharfage, pilotage, and other necessaries; (5) bottomry bonds in inverse order of application; (6) nonmaritime claims.

* * *

UNITED STATES shipping board is not subject to suit, being a commission or agency of the United States; however, the United States Shipping Board Merchant Fleet Corp. is subject to suit and liable for tort and breaches of contract as are other private corporations.—Cohn v. United States shipping board, 20 F. (2d) 56.

* * *

UNDER a provision of a freight engagement contract that if in the judgment of the steamship company conditions of war or hostilities, actual or threatened, are such as to make it unsafe or imprudent for its vessels to sail, the sailing of any vessels may be postponed or canceled; in order to excuse performance, there must be such a condition of insurrection or hostilities, actual or threatened, as would reasonably induce a belief in a prudent master or owner that the voyage can not be completed and delivery safely made at the point of destination.—Cohn v. United States shipping board, 20F. (2d) 56.

* * *

THE fact that a vessel makes no salvage claim does not deprive seamen of such claim if, in fact, salvage service was rendered. Meritorious salvage service must be recognized to encourage seamen to go to the rescue of disabled vessels, or else there would be danger of great sacrifice of property and loss of life.—MORZHOVOI, 20 F. (2d) 265.

* * *

WHERE ship employes signed statements on account after their discharge, without objection or protest, and signed releases upon being paid balance due as shown by its statements of account, and made no claim for wages until libel was filed, it cannot be said that wages were withheld without sufficient cause, so as to entitle them to penalties for wrongful withholding of wages.—Columbia River Smoked Fish Co. v. Lovesteen, 20 F. (2d) 122.

* * *

IN THE case of SURSUM CORDA, 20 F. (2d) 212, it was decided that a provision of a charter party requiring the consignee of the cargo to take delivery from alongside of the ship at the charterer's expense cannot be interpreted to require the ship to bear the expense of placing the cargo in storage, nor can a custom of the port be shown to extend its meaning.

* * *

THE case of MALCOLM BAXTER, JR., 20 F. (2d) 304, involved a question of limitation of liability. In the course of its decision, the court said: "If the circumstances under which the ship leaves port are such that it must be known that she will be compelled to deviate, e.g., a shortage of fuel, the deviation is voluntary. If, however, the ship leaves port unseaworthy, which includes one badly stowed, even if it was known, she does not voluntarily deviate if she seeks a port of refuge."

* * *

AN AWARD of $5500 damages to a stevedore 47 years old, unable to read or write, married, without children, and whose wages averaged as high as $26 a week, for injuries which resulted in the loss of a leg, was declared, in the case of HARALDSHAUG, 20 F. (2d) 337, not to be so inadequate as to warrant an increase.

* * *

FUMIGATION of a vessel is not a part of the owner's obligation to "keep the vessel in a thoroughly efficient state in hull, machinery, and equipment for and during the service." This refers to physical conditions, said the court in the case of Dampskibs Aktieselskabet Jeanette Skinner v. Munson Steamship line, 20 F. (2d) 345, and it does not contemplate the use of the vessel by the charterer. Fumigation is much like keeping a ship clean.

* * *

NORMALLY disputes arising out of a seaman's employment are referred to the tribunals of the flag. Nevertheless, courts of admiralty, which are sensitive to a seaman's rights, or at least have always professed to be, will in such cases, before turning him out of court, satisfy themselves that there are no special circumstances which will leave him without adequate remedy. Even the protest of a consul is not conclusive, when justice requires the court to entertain the plea. Courts are primarily established to decide the disputes of all suitors over whom they have jurisdiction, and some reason must be shown for their abdication. —FALCO, 20 F. (2d) 362.

* * *

A TUG having fulfilled her towage contract by delivering a barge to the consignee, without objection to the berth by consignee or by bargee, the risk in allowing the barge to remain in the position she was in when the tug departed was not the tug's.—EASTCHESTER, 20 F. (2d) 357.

* * *

A SHIP is on a steady course, not only when her heading does not change, but whenever her future positions are certainly ascertainable from her present position and movements. A steady course may thus involve many changes of heading; it is enough if these can with accuracy be foretold. If they can, so that at any given time in the future her position can be ascertained, she is on a course, and if that course crosses the course of another vessel, who holds her on her starboard hand, the latter must keep out of her way. Whether the way be sinuous, or the speed variable, makes no difference, so it be plainly disclosed. It is well settled that this applies to head-on cases in a winding channel.—Commonwealth & Dominion line v. United States, 20 F. (2d) 729.

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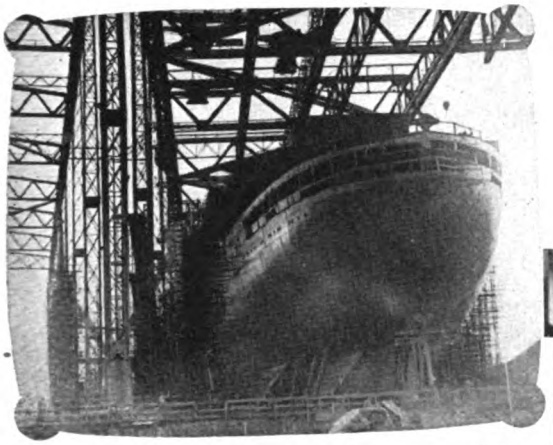
Latest Marine Events in Pictures



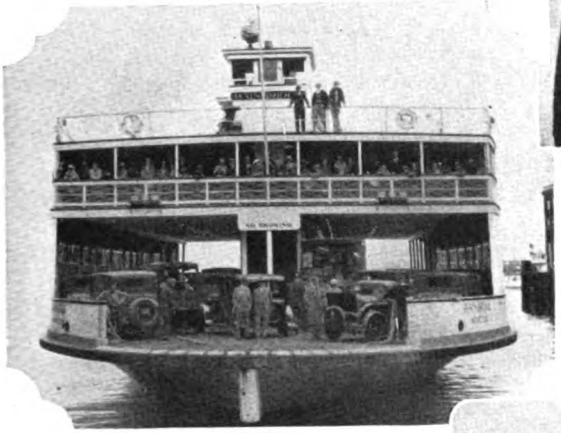
Below—New diesel engine automobile and passenger ferry, Bainbridge, recently completed for service between Seattle and Port Blakely, one of six automobile ferries radiating from Seattle. The Bainbridge averages 11 knots. Described in detail in the August number of MARINE REVIEW

Left—The S. S. Europa, one of two 46,000 ton transatlantic liners building for the North German Lloyd line at Bremen. American Ambassador Schurman christened the liner at launching

Above—Illumination of the S. S. Quebec, one of the three similar Canada Steamship lines' recently completed river excursion steamers. This vessel is 360 feet long and is illuminated by a single type AF8 floodlight using a thousand watt lamp. Light furnished by the B. V. T. Corp. of America. Time of exposure three minutes

Above—Capt. Theodore Van Beek, commander the President Roosevelt, which carried the American athletes to the Olympic games at Amsterdam

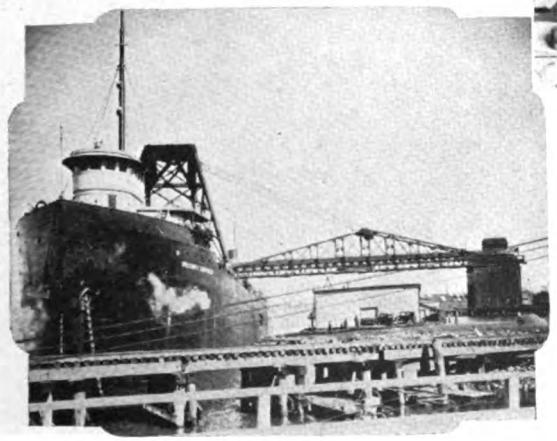
Right—A scene from former days. One of the riveters that made Hog Island possible. Riveting a fabricated hull in 1918



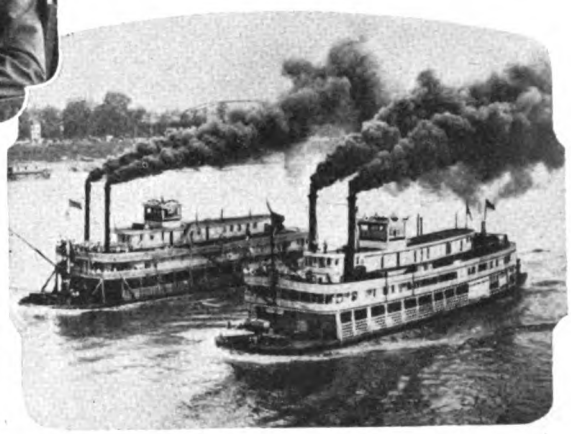
Right—One of the Great Lakes modern bulk ore, coal and grain carriers. Steamer Joseph H. Frantz of the Columbia Steamship Co., Cleveland

Below—William E. Rapprich, formerly a Great Lakes bulk freighter converted into a self-unloader at the plant of Leathem D. Smith Dock Co., Sturgeon Bay, Wis.

Below—Left to right, Ohio river packets Betsey Ann and Chris Greene. Start of their famous 20-mile race, Cincinnati to New Richmond, O. The Chris Greene won by two lengths after two hours and twenty-five minutes of the sternest kind of a race, amid great enthusiasm



Above — H. T. Herr, vice president, Westinghouse Electric & Mfg. Co. Head of the South Philadelphia plant which turns out marine propelling equipment



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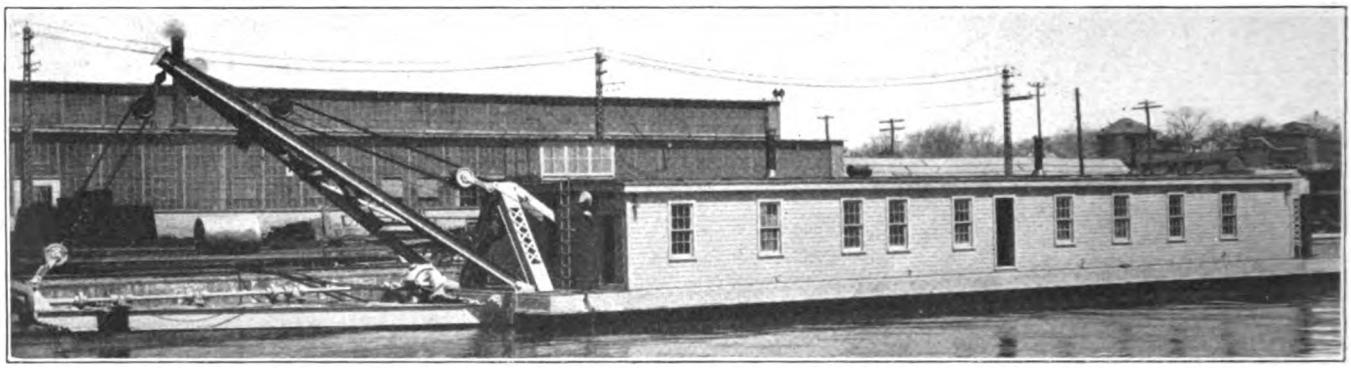


State of New York Hydraulic Dredge No. 4 fitted with Bessemer Diesel Engines

Diesel Hydraulic Dredge

THE hydraulic dredge shown in the accompanying illustrations, recently placed in commission on the canal, was designed by the state of New York and built at the Syracuse shops under the supervision of Major. T. F. Farrel, commissioner of canals and waterways, William M. Acheson, chief engineer and Guy W. Pinck, district engineer, the latter being in direct charge.

The hull is 106 feet long by 28 feet beam by 8 feet depth, and with the exception of two hoist winches and the cutter motor, all machinery is mounted in a well 66 feet long by 15 feet wide by 3 feet 1 inch deep. With the exception of the deckhouse, which is of wood, the rest of the construction is of heavy steel.

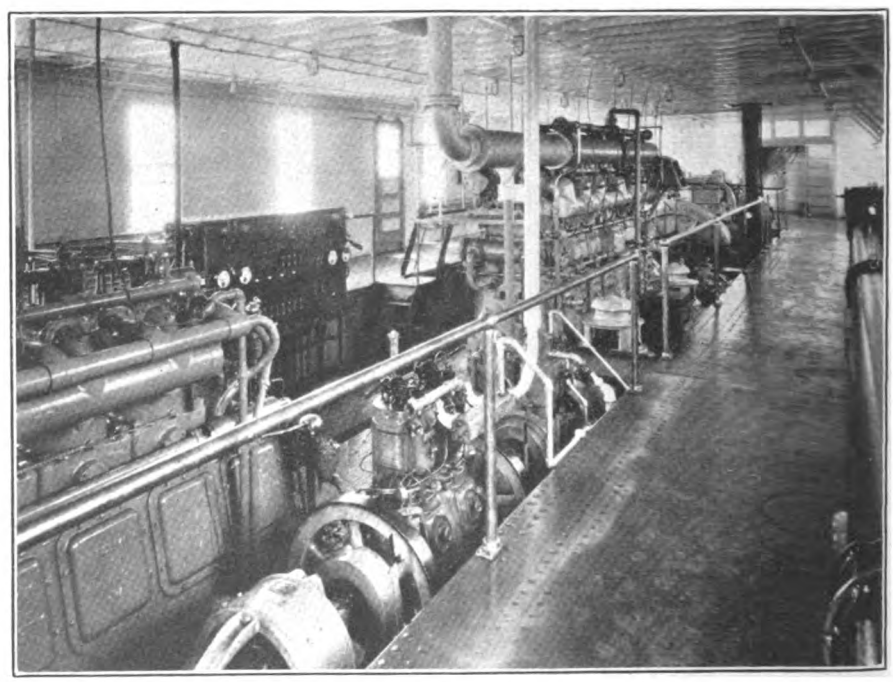
In addition to usual transverse frames and intercostals, a pair of 15-inch channels run from the pump casing to the after well bulkhead, which serve as foundation girders for the pump and its engine as well as the generating unit. These are supplemented by another pair of channels of the same size running from the forward end of the pump engine to the after end of the generating engine. These are capped by a 1-inch plate, which forms a box girder on either side upon which the engines are set. The flywheel diameters are small enough to clear these fore and aft girders without any cutting, leaving a very rigid backbone in the dredge which is a point often overlooked in diesel installations of this type.

Fuel is carried in ten elliptical shaped tanks, five on either side of the well under the main decks, with a total capacity of 25,000 gallons, which is enough for about 650 hours under full power and gives her a very good trim.

On the forward deck a four drum American hoist geared to a 25-horsepower motor takes care of the forward spuds, the ladder and boom hoists on the after deck. A two-drum hoist geared to a 10-horsepower motor takes care of the after spuds. A 40-horsepower ventilated motor, through a 30 to 1 reduction, drives the cutter (at 20 revolutions per minute), the controls of which along with an ammeter are in the operating room. This enables the operator to judge the character of the material he is cutting.

With the exception of the hoisting machinery and cutter motor, the machinery was supplied by the Bessemer Engine Co., Grove City, Pa., which firm supervised the installation and assisted the state of New York in the many interesting engineering details.

The diesel pump engine is a Bessemer six cylinder, four stroke cycle, developing 500 brake horsepower at 275 revolutions per minute, direct-connected through a Francke floating ring type of flexible coupling to a 15-inch Morris centrifugal pump capable of delivering 200 cubic yard solids per hour against a 40-foot head (pumping 10 per cent solids). With a fine loose material the pump handles up to 25 per cent solids. The main auxiliary unit is also a Bessemer, 4-cylinder diesel engine direct-connected to a 100 kilowatt, 250 volt, direct current General Electric generator, which supplies all the current for lights and auxiliary machinery on board. An emergency unit, capable of being started by hand, or air, is a 2-cylinder Hill engine, direct connected through clutches to an 8 kilowatt, 250 volt, generator on one end and a 5½-inch x 2¾-inch x 5-inch, two stage, air compressor on the other, also chained through a clutch to a 4-inch



Machinery fitted in well on Hydraulic Dredge No. 4. Ample deck space on sides

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Gould centrifugal pump as an extra.

Two 4-inch Morris vertical centrifugal general service pumps are driven by 30-horsepower direct connected vertical motors. These pumps supply water pressure for a Schutte and Koerting ejector, which primes the dredging pump and also furnish cooling water for the pump engine and other general service. Only one of these units is used at a time under normal operating conditions, the other being in reserve. A 5½-inch x 2¾-inch x 5-inch two stage air compressor direct connected through a flexible coupling to a 15-horsepower motor, furnishes starting air up to 250 pounds per square inch.

One of the requirements of the dredge was to be able to start the main pump engine in eight minutes after starting the air compressor to charge the air tanks from zero gage pressure. Under normal operating conditions this unit is used very little as the 100 kilowatt generator engine has an air compressor driven off the crankshaft, which supplies air for keeping the four air tanks charged and these are ample for starting both the pump and generator engines at once.

Two 10 gallons per minute motor driven Viking pumps are used for transferring fuel and lubricating oil. These are also supplemented by two emergency hand pumps of the same make. A DeLaval centrifugal is used in the lubricating oil system. Reed air filters are fitted to both pump and generator engines as all canal dredges are frequently operated in the vicinity of dry sand banks. Brown exhaust pyrometers are used throughout.

All motors, generators and switchboards are General Electric manufactures which with the exception of the hoist and cutter motors are of the push button type. The latter feature makes it very handy for the engineer.

A study of the accompanying pictures shows a wide unobstructed deck, full length of the dredge on either side of the machinery well, which was accomplished by having the discharge from the main pump come out at the bottom instead of the top and bringing it up to deck level by using two long sweep ells and then carrying it out over the stern.

The overall height is necessarily low, being 18 feet from bottom of hull to top of house in order to get under bridges; everything above this height is easily dismantled. In every detail this dredge is a thoroughly modern example of dredge design, and its performance to date is the best example of the correctness of its engineering features and the efficiency of its equipment together with the great accessibility of the power plant and controls.

What Shipbuilding Means to Industry

THE Jones-White merchant marine act is the most constructive piece of merchant marine legislation that has been enacted within my recollection. While the act may not accomplish everything necessary to establish a permanent American owned, American built merchant marine in the foreign trade, under private ownership, it is nevertheless a very important step in that direction.

In the first place the act reasserts a "policy" backed up by a very large majority vote in both houses of congress and further supported by a provision for long-term mail contracts for speeds of 10 knots and upwards. The provision, together with a liberalization of loans, both as to the amount of the loan and the rate of interest, will make it possible for the private steamship owner to adopt a constructive program for operation, and to provide for the building of new tonnage.

That some new vessels will be built this year as the outcome of this merchant marine act seems assured and this assurance is necessary to save the private shipbuilding industry of the United States which is now at its lowest ebb within the history of modern steel ship construction.

The new merchant marine law is a notification to the world that we propose to carry a reasonable proportion of our world trade in our own vessels built in American shipyards.

From a recent statement made by H. G. Smith, vice president of the Bethlehem Shipbuilding Corp.

The breakdown in percentage of the cost of a 10,000-ton freight steamer shows the following:

Material	50.20
Labor	39.94
Insurance Fees, Taxes and Depreciation	5.36
Freight	4.50
Per Cent	100.00

The percentages will be about the same for a motor-vessel if the diesel motors were constructed at the shipyard. The above percentages show that for every $1,000,000 spent in the building of a new vessel that $502,000 is for materials ordered from practically every industry in the United States. An analysis of the material distribution, of an actual vessel built at one of our large shipyards, shows that practically every state in the Union participates in the material required in the building of a vessel.

Contrary to the general belief, however, the "iron and steel" in a ship is probably not over 20 per cent of the total material cost. Balance of the materials consists of copper, tin, zinc, lead, lumber and allied products, textiles and their products, rubber products, leather, electrical products, stone, clay and glass products, all of the elements entering into auxiliary machinery running through the entire gamut of material down to miscellaneous hardware and food supplies.

Summing up, therefore, the provisions of the bill are such that new construction seems certain. This construction will be carried out in American shipyards and over one-half of the stimulus given to every ship built is a stimulus to nearly every branch of American industry.

British Shipbuilding Costs, 1921 and 1928

REGARDING the present low cost of shipbuilding in Great Britain the following comparison of cost over there in 1921 and today, quoted from *The Liverpool Journal of Commerce* for July 28 1928, is of special interest:

"A striking example of the manner in which shipbuilding costs have tumbled down since the boom period of 1920 is afforded by the announcement which appeared in *The Journal of Commerce* yesterday to the effect that the Wallasey corporation has decided to order a new steamer for their vehicular ferry service on the Mersey. The vessel is to be built by the Caledon Shipbuilding and Engineering Co., Dundee, for the sum of £43,260, twelve other firms having submitted tenders. The new boat is to be similar to two of its successors, but incorporating certain new features and improvements which experience, gained in the operation of these boats, has deemed expedient. The two previous boats were ordered in 1921, and cost respectively £103,000 and £109,000; in other words, an improved boat today costs considerably less than half the price ruling in 1921."

Word from Germany indicates that the company formed to develop the rotor ship, a Flettner invention, has been dissolved.

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Dock Management Progress Section

How Successful Dock Operators Have Met Problems of Giving Best Service to Ships

Moving Freight by Power from Ship's Side to Warehouse Reduces Time of the Ship in Port

Mechanical Handling of Freight Reduces Ship's Port Expenses

By Willard C. Brinton
Part I

THE function of a ship is the transportation of passengers or freight between ports. When a ship is in port it is not functioning.

For a steamship line in foreign trade or intercoastal work, approximately one-half of the total budget is spent on terminal activities. The per diem charges for a ship can easily be segregated in proportion to the number of days the ship is at sea and the number of days in port. Interest on capital, depreciation and obsolescence can quite readily be allocated. General admistrative expenses may not be quite so simple to divide between operations at sea and port activities, but, on any basis, a large portion of administrative expense is properly charged to the ship in port.

The author would like to publish percentages of representative steamship lines in support of the point of view that terminal activities are such a large fraction of the total budget, however, the confidential nature of these figures makes it difficult to give actual data. Tabulations are therefore omitted, but it may be said that port activities may be as high as 60 per cent against 40 per cent at sea.

The maintenance of continuous service of a foreign or intercoastal shipping line requires a number of ships. Operations are naturally on a large scale and the annual budget of any such line runs into millions. It is surprising that the organization of steamship companies usually disregards the functional division between port activities and sea activities. They handle their port activities on a basis of line organization rather than staff organization. The executive at the top whose scope is sufficiently wide to include all port activities is busied with many varied problems affecting his corporation as a whole. There is usually no single individual who makes a specialty of all these activities of port organization for which millions of dollars are spent yearly and which so greatly affect the success of the undertaking.

From a paper presented at the national meeting of the A. S. M. E. Materials Handling division, Philadelphia, April 23, 24, 1928. The author is president of the Terminal Engineering Co. Inc., New York. The photographs used as illustrations were supplied by the company at the request of the editor. This article is in two installments and Part II will appear in the October issue.

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The superintending engineer or marine superintendent of a steamship line, whatever his title may be, usually has had years of experience in his field. In general it may be assumed that he has reduced the cost of ship operations at sea to a point where it would be difficult for any further savings to be made on any specific ship for such items as fuel, lubricating oil, repairs, etc. It would seem that the men who have made these excellent records for the operation of ship machinery would be naturally the ones to improve the methods of terminal operation. However, they do not usually have authority over the terminal work and perhaps consider it somewhat beneath their dignity. There has been too much of a tendency to consider terminal work a matter of driving men through a labor boss with vocabulary amply profane. Perhaps the idealism of the engineering-trained man has made him retire from pier work to what Kipling would call his steam gadgets. Whatever the cause may be, at the present time there are relatively few men in the terminal operations of shipping companies with mechanical training, not to mention engineering education.

Practically all of the problems of a ship in port are of such complexity that a trained engineering mind is needed for adequate solution. Ships should be designed with a definite relation to the cargo. In so far as possible the ships and piers should be designed together. Naval architects have given the port needs of ship design much less attention than is deserved. Yet during the last few years quite remarkable improvements have been made in ship design tending to increase the speed or reduce the cost of a ship at sea. We now have electric drive, geared turbine drive, diesel engines, pulverized coal and many other alternative methods for greater speed or economy on the ocean. Recent increases in speed and reduction in fuel consumption at sea have so reduced the costs incident to sea operation as to make costs incident to port operations "stick up like a sore thumb." There is a fascinating interrelation between all the factors entering into the cost of ship operation—change any one and it affects others.

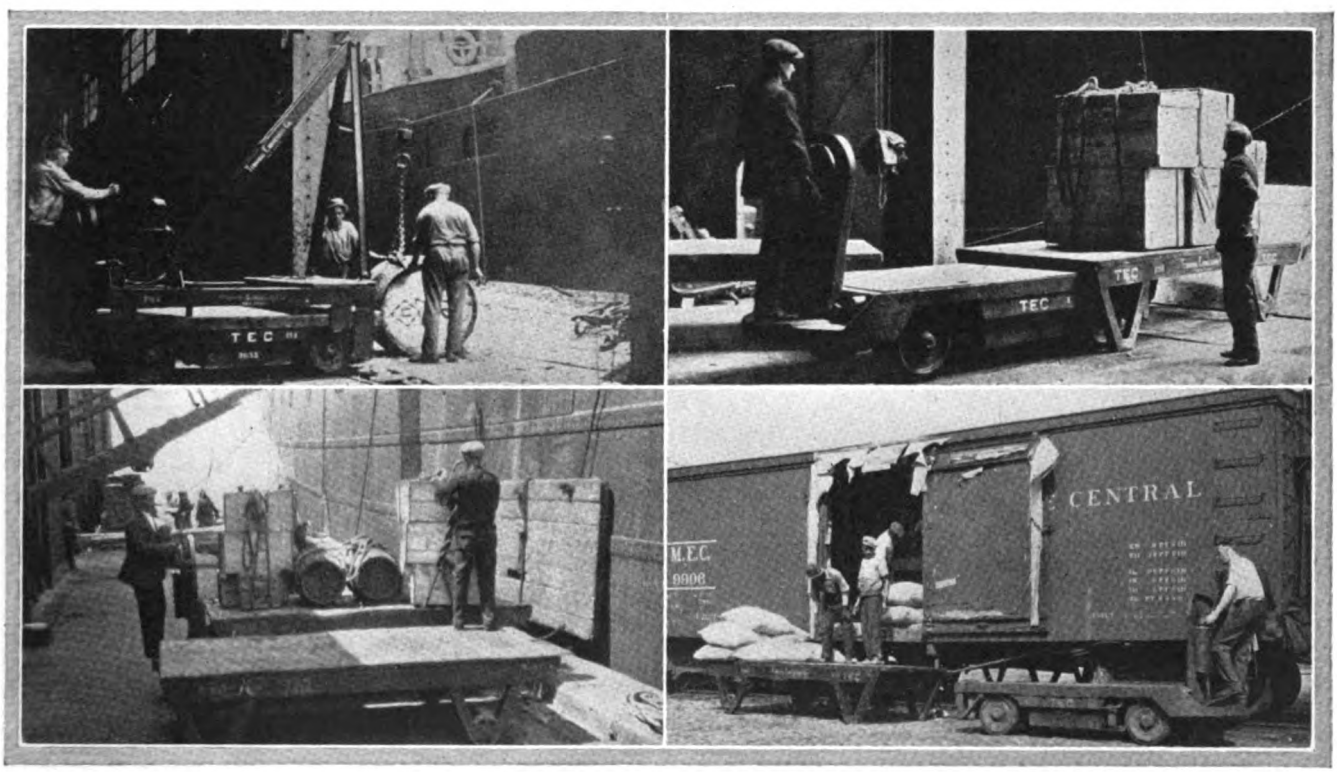
Costly Cargo Handling

During the time that these recent engineering improvements in ship design were taking place there has been a constantly increasing wage rate for stevedoring. One ship operator has said that it costs more to put the cargo into a ship and take it out at the other end than to move it from New York to San Francisco. Of the port activities stevedoring bulks so large that any increase in wage rates or decreases in effectiveness of labor seriously affects the owner of a ship. The work of handling ship cargo is not only severely arduous but the accident rate is disgracefully high. Compared with usual industrial operation stevedoring work seems unnecessarily crude. The men themselves must realize this and may be justified either in leaving the field entirely or in asking still higher wages to cover the muscular strain and the danger hazard involved.

For the last few decades ocean carriers have been largely controlled under foreign flags. Our intercoastal business dates only since the opening of the Panama canal and was much upset during the World war. American terminals have in many instances been managed by men in the employ of foreign steamship lines, temporarily assigned to authority in any American port. These men have been thousands of miles from home and have had difficulty in getting authorization from abroad for making any innovations or expenditures at American terminals. Under such circumstances, should there be surprise that progress has been slow?

There is a more progressive spirit at Pacific coast terminals than on the Atlantic coast. However, the Pacific coast piers are of recent construction and the methods of operation have evolved according to the needs without being so heavily handicapped by precedent. But even on the Pacific coast there is still almost unlimited opportunity for bettering terminal performance.

Americans may well be proud of



Upper Left—Truck has short turning radius, large loading area and can operate in both directions. Upper Right—Minimum waste area. Room only for driver while battery is below floor. Lower Left—A number of cargo drafts may be made up in advance of ship's requirements. Lower Right—Freight car one quarter mile from the ship. Cargo handled without delay.

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Essential Features Required in Equipment for Handling a Great Variety of Freight on Steamship Piers

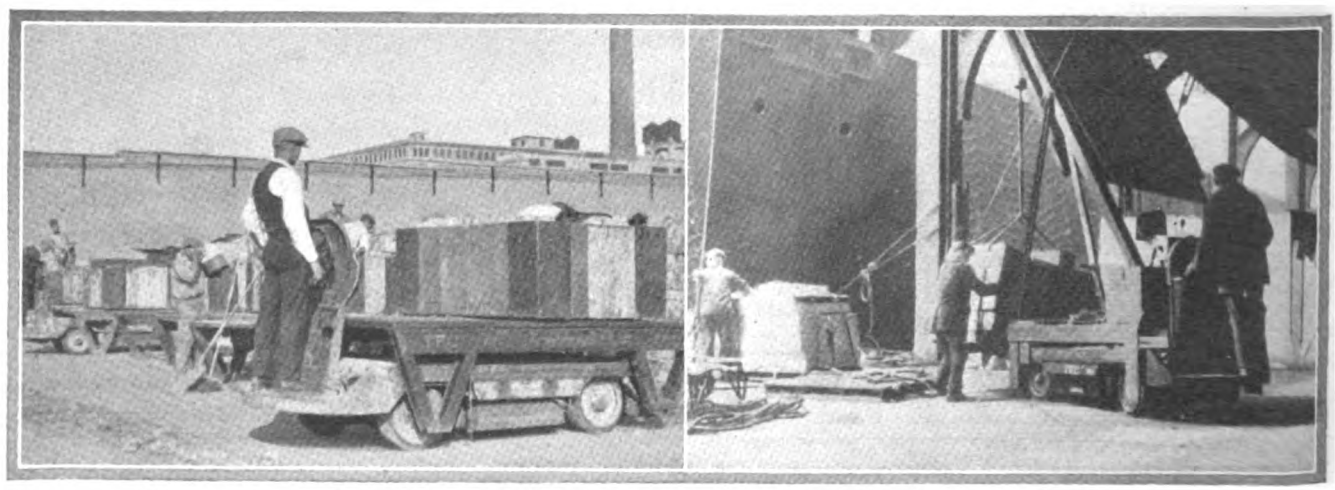
1. *Area sufficient for more than one draft of usual cargo.*
2. *Smallest possible space occupied for a given volume of freight.*
3. *Lift mechanism for use with separable platform bodies.*
4. *Shortest possible turning radius.*
5. *Quick acceleration.*
6. *High speed with safety.*
7. *Ability to operate equally well in either direction.*
8. *Ample rubber tires and leaf springs throughout to give least shaking effect on rough floors.*
9. *Legs of separable platform bodies to be opposite truck wheels.*
10. *Ability to negotiate 20 per cent grades with loads to or from lighters or side-port ships.*
11. *Tractive power sufficient to shift freight cars.*
12. *Design arranged for pushing freight by sliding on pier floor.*
13. *Automatic coupler so that lift truck can be used as tractor whenever trailers are of any advantage.*
14. *Small fire risk for use through side-port ships.*
15. *Ability to handle material 20 feet or more long.*
16. *Quickly attached power-operated accessories.*
17. *Instantaneous crane attachment for lifting drafts made up directly on the floor.*
18. *Low center of gravity to permit high stacking with crane attachment.*
19. *Unit construction necessitating smallest possible number of different repair parts.*
20. *Lubrication arranged for minimum attention.*
21. *Ability to operate through city streets and over railroad tracks adjacent to terminals.*
22. *Versatility sufficient to handle effectively any style of cargo worked on a pier.*

their achievement in the handling of bulk cargo, ore, coal, grain, etc. But it is an easy matter to handle by machinery any type of uniform cargo whether in bulk or in packages. In the handling of package cargo there is little difference between operations in this country and abroad. The store door delivery system, common abroad, is far in advance of our methods here for handling package freight at railroad terminals. Our railroad cars are so much larger than the cars abroad that shipments are accordingly larger here, and this makes the installation of machinery more feasible at steamship terminals where the wheels and keels meet.

The problem of handling steamship package freight depends chiefly on the volume rather than the weight of the goods involved. It is not at all difficult to build machinery to handle imported pig tin, lead, copper, etc., because the machines with ample weight load could easily maneuver in crowded quarters. To justify a power machine instead of the common hand truck it is necessary to have the power equipment carry enough volume of the bulky cargo to show an economical operation. The power-operated equipment on a pier has two major advantages over the hand truck in horizontal transportation; it can carry a heavier and more bulky load, and it can move it more rapidly. If, in addition, the power equipment can be supplemented with attachments that permit high stacking of heavy freight, there is great advantage on the side of the machine as compared with the hand truck.

The operation of loading a ship is more simple than discharging because sorting is usually involved in the discharging operation. A comparison of the hand-truck loading and machine loading of ships will be sufficient to indicate some of the fundamentals of the problem. It is customary to make up drafts of freight each weighing approximately one ton. When hand trucks are used, several hand-truck loads are necessary in each draft for the ship's tackle. Making up of a draft at the side of a ship causes congestion in a space only 10 feet square. The effectiveness of the work in this small space largely determines the length of time the ship must remain in port. Also, the bringing of various hand-truck loads to the side of the ship to make up a single sling load usually results in a mixing of the freight and breakage to the cargo, since the sling might include more than one type or size of package.

It is essential to bring drafts to a ship completely made up ready for hoisting and to take them away from the ship complete rather than in numerous hand-truck subdivisions. A complete draft of a ton or more is too heavy a unit to be moved horizontally by hand labor. If the management asks the average pier foreman to apply machinery and improve his methods, he is likely to begin by considering a tractor to pull the four-wheel hand trucks. The tractor sounds cheap and is often expected to work a revolution without any replanning of related equipment and conditions. Should a power tractor be used to pull completed drafts, the combined length of the tractor equipment and the freight becomes serious. Also, tractor equipment is not capable of backing out satisfactorily from blind alleys. Another point seldom thought of is that the ordinary four-wheel hand truck is not at all satisfactory as a trailer. Good trailers for pier use are expensive and the combined



Left—Special containers can be used. Right—Airplane slings can be transported by trucks with crane attachments

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Left—Driving into and out of Blind Alleys facilitated. Right—Lumber handled at general Freight Piers as required

investment of any tractor with sufficiently good trailers becomes much more than usually contemplated. In crowded quarters tractor operation is slower than lift-truck operation, and there is much more shaking off and damage to freight because of the vibration if trailers are not equipped with leaf springs and good rubber tires. If trailers are equipped with springs and rubber tires, the investment and the maintenance becomes large because of the great number of trailers necessary.

Results from Observation

In 1912 and 1913, during some advisory work for the Bush terminal in Brooklyn, the author had an assistant observe every type of freight handled on the seven large Bush piers each morning for a whole year. By this method there was a study of all the different classes of freight handled seasonally. It is believed that these studies are the most complete ever made of the problem of handling export and import pier freight. Tractors and trailers were thoroughly studied in service and proved deficient on the grounds stated above. The features enumerated in the accompanying table were found essential for any type of equipment to handle the numerous classes of freight found on steamship piers.

Electric storage-battery trucks built on the foregoing lines have now had years of service on steamship piers handling practically every kind of freight that comes to a pier. A check of the principles has shown their correctness, and vast savings to shipping are possible by further application along proved lines.

The use of the crane attachment for a truck with an alternative set of lift bodies permits the working method to be changed if necessary every few minutes throughout the working day. Where the freight is light and bulky the lift bodies may take on one trip what might require several trips with the crane. If the material is too heavy to lift on the separable bodies —for instance, oil or chemicals in barrels—several barrels can be carried at one time with the crane attachment. If high stacking is necessary, the crane attachment can save much human labor. Although numerous types of attachments can be applied to this type of electric truck, the handling of miscellaneous cargo requires that any kind of package be worked without too many different kinds of attachments and only one size of truck.

The technique of freight handling on steamship piers has been built up over a century or so of using the hand truck. The ordinary point of view is to use the hand trucks most of the time and mechanical equipment only on special jobs. This code is being reversed and there are now some steamship piers on which a hand truck is seldom seen. The thing to do is to apply the machinery and develop the right method for machine trucking for each particular class of freight just as hand truck methods have heretofore been developed. The pier workers themselves are interested to make the work as easy as possible and in the aggregate will furnish many of the ideas for the ultimate best machine methods.

Hand Truck Traditions

Ships have increased greatly in size during the last 15 years. Most ships tie up at piers built in an age of smaller ships and cargoes. As a result there is not enough space on the pier itself to hold the cargo. Either the ship must be moved, if the pier has sufficient length, or the cargo must be carried long distances lengthwise, piled high in the air, or some combination of these methods. This factor of big cargoes has greatly increased the length of trucking distances and the height of piling. Distance does not make a material difference to mechanical methods, but it vastly increases costs if hand-truck methods are used. High piling is still done largely by hand because sufficient study has not been given to the application of machine methods.

Sorting of discharged cargo costs hundreds of millions of dollars yearly and practically nothing is being done to remove the cause. Fundamentally, sorting is due to the small size of the packages of freight. Packages have been made man size rather than machine size, The chief difficulty in sorting lies in the lack of co-operation between the loading and unloading organizations at the two ends of the ship's run. Ships are often scheduled to stop at many ports and the sorting involved at the point of discharge is a composite of the loading methods at all points of origin.

Sorting a Source of Expense

Unless some one man or group of men is constantly studying this situation, unnecessary costs due to sorting of cargo are sure to result. Of course, not all cargo can be stowed simply, as it is frequently necessary to pack the smaller packages between the larger cases of machinery, etc. Because of the diversity of the American manufactured products there are all kinds of sizes and shapes exported. Typewriters must be loaded with locomotives. Discharging a cargo of diversified manufactured products is justifiably more complicated than the handling of the raw materials imported into this country and discharged at American ports. We should be able to improve greatly on the methods of discharging in this country since much of the inbound freight comes in large lots of one size or kind of package.

Where the packages are all of one size or shape it is the sorting accord-

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ing to the identification mark on the packages that causes tremendous confusion, delay and expense. If the packages are not stowed in the ship so that packages of one mark can be easily segregated, then the drafts from that ship may seem to contain even more marks than there are packages. Labor is cheaper in all other parts of the world than it is in this country. Every steamship operator should wage an increasing campaign to see that cargo is so loaded at foreign ports that it can be most cheaply and quickly discharged here. One prominent freight line has recently reduced its American direct costs of discharge approximately 20 per cent on an average of six months as compared with the preceding six months. This was done chiefly by proper stowage on the ship by which freight was put into blocks according to the marks. With the block stowage it is possible to make up drafts inside of the ship so that they may be hoisted out one mark to the draft. By using larger drafts and machinery on the pier it is a simple matter to get the freight directly to the proper pile on the pier as the whole draft can then go to just one pile. Freight is high in the air when it comes over the side of a ship. The higher it is carried by power trucks across the pier the smaller the amount of labor required to stack on the pier.

(To be Continued)

The Vibration of Ships

By Thomas C. Rathbone

IN SHIPS equipped with comparatively slow-speed reciprocating engines, it is a common occurrence for serious vibration to be set up at some particular engine speed. The usual remedy is to avoid this speed or to pass through it as quickly as possible.

When steam turbines or diesel engines are used for propulsion, however, conditions become much more complicated, and it is not always possible to prevent objectionable vibration by any such simple means. A ship will vibrate as a whole in a number of different ways and in response to a number of different frequencies, and a machine with a wide speed range may "tune in" with two or three or more of these critical frequencies and thus give rise to trouble at several operating speeds.

A great deal of careful study has been given to this subject in recent years; several special instruments have been devised to measure the magnitude, frequency, and direction of vibrations; and though obviously vibration cannot be absolutely suppressed, considerable progress has been made in the direction of rendering it negligible. The S. S. WAIALEALE is a case in point. As a result of careful design and construction, she is reported as being without "noticeable vibration."

The accurate balancing of high-speed rotating parts, such as turbine spindles, both when at rest and when running, is an important step towards the reduction of vibration—so important, in fact, that it should never be omitted. But it is not the whole story. A machine balanced as perfectly as possible still vibrates; and though these vibrations are minute, they can still give rise to troublesome effects through resonance.

The next step is to so design the foundations of the machinery as to avoid the occurrence of major natural vibrations within the machine's speed range. Engineers now realize that the critical speed of the rotating element itself loses its identity in the assembled structure. New and additional critical speeds appear, totally different from that of the rotor alone on rigid supports. These new resonant speeds depend largely on the weight of the stationary masses and the elasticity of the supporting structures. This problem is a highly complex one, especially for marine installations, yet it appears to be possible to take care of one or two of the major modes of vibration, with certain assumptions as to the rigidity of the hull itself; and there is every reason to expect further improvement in this phase of engineering work.

Finally, if, after all known advance precautions have been taken, the ship does vibrate badly at certain engine speeds, a vibration survey of it can be made, and the vibrations can usually be overcome by relatively simple means, such as by changing the mass or the elasticity of local structures.

Although the present status of our knowledge of this whole subject is still far from satisfactory, the advances made in the past few years encourage the belief that engineering science will in time master vibration as it has many other serious difficulties.

Safety Congress to Meet in New York

The seventeenth annual safety congress of the National Safety council will meet, in the largest convention ever held in the United States, in New York city during the week of Oct. 1 to 5 inclusive. More than 5000 delegates from all parts of the United States and foreign countries will attend. There will be over 270 speakers.

The marine section is one of the most important divisions of the National Safety council. It is composed of nearly 200 of the leading American steamship owners and operators, shipyards, stevedoring companies and affiliated organizations. No group has more thoroughly realized the importance of safety and consequently it is bringing every influence to bear to coordinate and strengthen efforts to reduce all accidents to a minimum.

During the convention the headquarters of the marine section will be at the Waldorf Astoria, New York city. The following meetings will be held: Monday, Oct. 1, Propeller Club of the Port of New York day. On this day commencing at 9:30 a.m. in the grand ball room of the Hotel Commodore, the general session of the National Safety council will be held. An address will be made by Homer L. Ferguson, president of the Newport News Shipbuilding & Dry Dock club. On Tuesday, Oct. 2, known as New York Maritime Exchange day the marine section will meet at the Waldorf Astoria at 9:30 a.m. The opening address will be by John Dowd, president, New York Maritime Exchange.

On Wednesday, Oct. 3, known as American Steamship Owners day, the marine section will meet at the Waldorf-Astoria at 9:30 a.m. and the opening address will be made by H. B. Walker, president of the American Steamship Owners association. Thursday, Oct. 4, will be known as the National Board of Steam Navigation day and the marine section meeting at the Waldorf-Astoria at 9:30 a.m. will be addressed by A. J. Grymes, president, National Board of Steam Navigation.

Complete information concerning the scheduled meetings of the marine section of the National Safety council may be obtained by addressing Arthur M. Tode, vice chairman of the marine section, care of The Texas Co., 17 Battery Place, New York.

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World Trade Center Moves West

Pacific Coast Shipping Shows Astounding Growth During Last Fifty Years—Panama Canal Great Factor in Rapid Commerce Expansion

By Robert C. Hill

FIFTY years ago practically the entire commerce of the North Pacific centered at San Francisco, which, 30 years previously, had come into being due to the gold rush of '49. Deep sea trade was carried almost exclusively by sailing ships although the Pacific Mail had pioneered the transpacific route with a line of steamships to China and Japan.

Today, every port on the North Pacific is growing by leaps and bounds. The windjammer of yesterday has almost disappeared but modern services by steamship and motorship radiate in every direction carrying the products of the world to and from California, Oregon, Washington, Alaska and Hawaii. Last year these states and districts produced approximately 10 per cent of the nation's entire trade, including both imports and exports.

Capt. Robert Dollar's Vision

So rapidly has the ocean commerce of the Pacific basin developed in the last few decades that students of the world's trade predict that in the not distant future the center of the world's commerce will be established here. Even as the Atlantic took this prestige from the Mediterranean, which enjoyed the honor from the beginning of history, so the shadow of coming events seems to indicate that the Pacific shall be the center of commercial activity in the future.

No less an authority than Capt. Robert Dollar, the patriarch of American shipping, believes that the Pacific basin is on the verge of unparalleled activity which will center the eyes of the world on the western shores.

"The commercial development on the Pacific," he stated recently, "will in time demand a population of 50,000,000 people in the state of California and corresponding increases in the other Pacific states. The intelligence used and the intensity with which we build toward this density will be the deciding factors in the time element involved.

"China is the greatest potential market in the world. The western states through their geographical location will logically monopolize this trade. The surface of Pacific trade possibilities has only been scratched, uncovering a gold mine of future commerce. No one can predict at this time when the political troubles in China will be settled but when peace finally comes to that war torn country the door will be open to a consuming public of 50,000,000 people and to a market that will never reach the saturation point.

"But China is only one of many potential markets open to the Pacific coast. The world's financial, commercial and population center is increasingly moving westward. All of these will eventually be located in our Western empire.

"As proof of this look at the wonderful expansion of commerce through the Panama canal. Two years ago this waterway exceeded the Suez canal traffic by 2,000,000 tons, a development I did not expect to see in my lifetime."

The effects of the Spanish-American, Japan-Russian and World wars, the opening of the Panama canal, the acquisition of the Hawaiian islands, the increase of population and output of essential products in Pacific coast states and the discovery of gold in Alaska have influenced in an outstanding measure the development of commerce on the North Pacific.

Trade From Overseas Possessions

The Spanish-American war brought the Philippines under the United States flag thus establishing a new trade route and giving the North Pacific a new market of vast possibilities. Even in greater measure the Hawaiian Islands have contributed to the increase in water commerce with the western states. The Japan-Russian war was followed by the active participation by Japan in the carrying trades of the North Pacific in which service the flag of Nippon has become increasingly important in recent years. The discovery of gold in Alaska called attention to that northern storehouse in which immense treasures are locked and resulted in a trade that has vastly benefited Seattle and San Francisco. Increase of population in the west has resulted in the production of a large surplus of grain, fish, mine products, lumber, manufactured articles, fruits and vegetables that has added thousands of tons yearly to the exports of the North Pacific. The opening of the Panama canal has brought the two coasts of North America so close that by means of the present fast and regular steamship services, an immense commerce, capable of indefinite expansion, has been developed. The World war brought the Pacific coast an unprecedented era of shipbuilding activity, gave it a fleet of merchant ships and opened up new markets which hitherto had been denied to the western states.

As an illustration of unprecedented growth it may be cited that the shipments of lumber from North Pacific ports to the East coast of the United States increased from 1,800,000 feet in 1919 to 1,919,668,928 feet in 1927.

Large Port of Entry

The Washington customs district ranked second to New York in 1927 in the value of foreign imports. More than 8,000,000 tons moved over Seattle water terminals last year. Seattle ranks second to New York in the number of people entering the United States through port cities.

The influence of the United States shipping board on Pacific commerce during the last ten years has been far reaching. The government established regular services from California, Oregon and Washington ports to Japan, China and Australia. For the first time in its history Puget sound for seven years has had a passenger and freight service under the American flag to the Orient that in speed and service has been equal if not superior to that offered by foreign lines. Now that the way has been pioneered the people of the Pacific coast are heartily in accord with the national policy of disposing of these fleets to private interests, presaging the withdrawal of the government from ship operation.

The expanding commerce of the North Pacific, in addition to the competition of American flag tonnage, has brought foreign ship owners to a keen realization of the possibilities of trade in the Pacific basin. They have consequently enlarged their berth services by building modern, fast vessels, many of them motorized, thus giving all Pacific ports an increased

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opportunity to buy and sell in offshore markets.

Since the World war there have been no replacements of American tonnage on Pacific routes. Consequently many of the fleets are more or less obsolete and it is found increasingly difficult to compete with new vessels under foreign flags. However, the enactment of the Jones-White bill has given shipping in the Pacific renewed impetus and it is certain that a building program will be inaugurated. Already officials of the Dollar line have announced that they intend to construct modern tonnage for their various services. It is true that the MALOLO, now on the Hawaiian route, and the CALIFORNIA, on the intercoastal berth, have recently been added to American flag tonnage but these routes are essentially coastwise. It is in foreign trades that American ships have been allowed to run down at the heel to the advantage of foreign carriers.

The effects of the Panama canal have been so outstanding in the recent development of Pacific coast commerce as to give it first place among all factors which have contributed to the expansion of trade with North Pacific ports. Not only has the great waterway cemented commercial relations between the West coast, Gulf ports and the Atlantic coast from Florida to the St. Lawrence but it has stimulated trade with the Mediterranean, Northern Europe and Great Britain.

Panama Canal Largest Factor

Before the war the Germans maintained a monthly steamship service from Europe via the Straits of Magellan, Chile and Peru but it required almost three months to make European deliveries here and an equal time to ship North Pacific products in return. One or two British lines were in service between Great Britain and the North Pacific via the Orient but the carriers were slow and the time consumed was a bar to the quick interchange of products.

Today there are fifteen regular steamship lines operating between this coast, the Mediterranean and Northern Europe. Deliveries of freight from British Columbia and Puget sound are made in Great Britain and Europe in 45 days or less. Fast, modern steamships are carrying an increasing tonnage of grain, copper, fish, fruits, vegetables and other products, returning with a miscellaneous variety of raw materials and manufactured goods. Regular refrigerator service is now provided making it possible to ship thousands of boxes of fresh apples and other fruits to the great markets of Europe.

For nearly fifty years the North Pacific has been one of the principal granaries of the world. Europe has been a steady market for wheat from Washington and Oregon and barley from California. Until fifteen years ago practically all of this commerce was handled by sailing vessels. Now the tramp steamer has monopolized this business, more than 200 bottoms, of about 7000 tons deadweight each having been chartered for full cargoes during the past export season. In addition the berth lines handle a large volume of parcel shipments. During the last year the movement of cargo to Northern Europe has increased by leaps and bounds furnishing one of the best markets offered the North Pacific.

Markets in South America

Another new market opened up to the North Pacific by the Panama canal is that of Brazil, Argentine and Paraguay. Until five years ago there was no direct communication between these two markets. However, regular steamship service has given North coast lumber a chance to compete with Southern pine on the east coast of South America. During 1927 nearly 70,000,000 feet of lumber, an increase of 20,000,000 over 1926, were shipped to the River Plate and adjacent markets from this section. Now refrigerator service is being supplied enabling the shipment of apples and vegetables from the North to Argentine and Brazil and on the return offering transportation for perishables from South America.

One of the remarkable developments of recent years has been the opening of Japan as a potential market for North Pacific lumber. Prior to the World war Japan imported practically no lumber from this side. Now Japan is considered one of the best of all foreign buyers, shipments to that country having assumed foremost importance of all markets. Last year lumber sent to Japan from this side totaled 933,033,000 feet or approximately 45 per cent of all lumber shipped to foreign ports from the North Pacific. Increase in the lumber business to Japan is shown by the following:

	Exports to Japan board feet	Percentage to total foreign shipments
1919	29,667,000	1.9
1922	568,169,000	28.7
1924	839,743,000	30.3
1926	919,382,000	31.3

Another market change attributed to the Panama canal is the diversion of a considerable portion of the transpacific overland cargo to the intercoastal lines. In other words cargo from the Orient, which in past years was discharged at coast ports and thence forwarded to the interior and Atlantic by rail, is in considerable volume now transshipped at coast ports from transpacific to intercoastal steamers. This is particularly true of bulky cargoes in which the element of time is not essential. Nevertheless the intercoastal services are so frequent and the steamers so fast that not more than fifteen days additional are required to ship all water while the saving in freight is considerable.

Naturally the trans-continental railroads have suffered considerable loss of revenue but in return the land carriers have benefited by an increase in local business and short hauls so that the changing conditions have not worked any great hardship upon them.

The importance of the North Pacific receives official recognition in the annual report of the Panama canal for the fiscal year ending June 30, 1927. The following statement is made therein:

"An analysis of cargo movements through the canal during the past year indicates strikingly the preponderance of the traffic between the two coasts of North America. In the Atlantic-to-Pacific traffic approximatly three-fourths of all the cargo tonnage moving through the canal originated on the east coast of North America and almost one-half was destined to the west coast of North America. The proportion of North American intercoastal traffic moving in the other direction was no less striking as more than 70 per cent of all Pacific-to-Atlantic cargo originated on the west coast of North America and slightly more than 68 per cent was destined to the east coast of North America."

Improvement in Service

The tendency of modern shipping is to abandon the slow tramp steamship service of recent years and to develop regular berth services by fast, modern liners. This change is particularly noted in the Pacific where owners see potential future business and are preparing now by establishing fleets of fast, up to date steamships and motorships, many of them with refrigeration or space which is becoming a necessary requirement in modern ocean carriers. Much of this anticipation of future needs is being met by foreign lines, Americans having been handicapped by conditions which they have been unable to overcome. However, the passage of the Jones-White bill is expected to give the American ship owner a new lease on life and in the Pacific there is no reason to be pessimistic of the future.

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Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	602	2,526,107	564	2,415,168
June	537	2,386,509	602	2,645,954
May	580	2,498,280	590	2,463,196
April	566	2,487,959	541	2,359,979
March	548	2,338,855	578	2,449,705
February	513	2,205,204	501	2,135,910
January	540	2,160,576	512	2,146,026
December	436	1,770,154	548	2,222,409
November	543	2,243,752	474	2,069,106
October, 1927	485	2,105,364	531	2,221,372

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	101	254,378	60	143,573
June	101	270,069	72	183,534
May	110	281,648	74	179,108
April	109	261,735	60	140,547
March	95	254,304	65	167,100
February	88	239,768	53	152,545
January	81	206,710	54	141,408
December	81	206,171	42	108,935
November	78	193,676	43	99,965
October, 1927	94	211,988	63	136,871

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	155	378,368	111	289,121
June	143	319,611	100	254,906
May	134	304,575	103	231,851
April	110	343,360	65	205,257
March	108	348,026	67	194,408
February	100	301,053	50	160,330
January	102	328,779	61	197,133
December	91	255,980	52	169,150
November	98	320,340	63	178,707
October, 1927	107	380,655	69	244,265

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	38	68,208	38	66,389
June	30	40,255	25	33,834
May	23	26,648	19	28,673
April	20	51,854	19	50,175
March	20	58,110	22	60,400
February	18	44,067	17	47,032
January	21	57,757	18	48,294
December	23	50,380	23	55,280
November	25	42,291	26	40,248
October, 1927	32	60,920	35	71,587

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	8	26,920	7	25,451
June	8	35,177	7	25,741
May	7	21,068	4	12,765
April	4	15,670	3	12,362
March	7	27,885	6	26,037
February	3	6,656	4	17,543
January	4	20,931	4	18,817
December	4	11,618	5	21,125
November	4	16,374	2	9,920
October, 1927	7	24,736	1	2,875

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	30	111,042	46	157,354
June	23	85,328	40	144,572
May	25	96,976	44	159,070
April	37	137,821	41	152,042
March	29	111,490	49	170,655
February	23	86,160	35	120,026
January	37	130,578	50	183,254
December	34	134,562	61	228,472
November	38	141,747	70	247,571
October, 1927	57	208,738	70	254,270

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	128	378,827	121	353,758
June	127	392,580	135	412,620
May	135	413,038	151	439,278
April	140	396,942	134	394,124
March	128	391,117	137	408,927
February	134	412,110	135	399,729
January	116	354,307	120	374,617
December	129	406,889	132	398,587
November	103	330,488	110	323,666
October, 1927	118	365,876	116	350,509

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	15	33,548	81	212,471
June	19	42,454	63	155,944
May	25	58,472	78	207,857
April	15	35,122	81	189,564
March	18	39,102	89	209,171
February	13	32,925	77	206,630
January	14	29,831	75	202,997
December	17	35,439	78	207,636
November	23	51,726	78	206,978
October, 1927	25	65,640	77	214,940

(Exclusive of Domestic)

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	30	81,634	31	79,222
June	26	54,449	28	57,111
May	26	58,800	28	63,779
April	26	68,581	26	61,939
March	25	65,435	28	68,630
February	31	70,881	28	58,896
January	26	71,686	27	71,721
December	25	59,744	27	72,636
November	33	72,807	30	74,376
October, 1927	26	66,539	24	62,881

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	86	65,838	88	67,720
June	98	83,417	93	78,006
May	134	117,930	129	112,303
April	101	75,140	102	76,450
March	119	96,746	112	94,408
February	121	91,928	109	88,819
January	110	85,955	123	85,750
December	103	91,299	101	90,557
November	112	92,152	107	89,156
October, 1927	80	87,814	83	88,587

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	101	209,990	82	189,008
June	85	176,088	82	178,337
May	102	227,194	90	209,449
April	114	217,803	105	203,515
March	107	242,444	97	246,634
February	94	271,569	83	226,210
January	117	309,644	82	216,381
December	75	189,231	73	178,068
November	75	161,528	79	176,885
October, 1927	89	210,973	97	237,282

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	64	261,850	58	228,946
June	44	180,482	44	185,765
May	53	206,254	61	239,241
April	56	226,257	54	210,908
March	46	191,601	46	196,371
February	54	210,176	53	207,173
January	50	206,743	62	239,133
December	56	232,726	58	241,398
November	59	231,003	68	264,841
October, 1927	68	268,666	69	272,875

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	260	659,457	245	615,234
June	253	615,672	263	640,136
May	263	671,333	261	647,504
April	254	656,537	265	666,345
March	265	669,301	282	720,407
February	238	627,445	236	616,772
January	271	725,935	272	697,301
December	240	671,775	258	714,455
November	226	586,013	236	609,299
October, 1927	260	693,720	265	710,922

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
July, 1928	26	59,204	27	61,976
May	29	71,467	32	78,731
April	26	60,165	21	52,590
March	29	79,789	27	67,472
February	26	74,244	27	73,168
January	32	83,419	52	150,260
December	27	65,379	25	63,354
November	32	77,911	33	81,978
October	37	95,473	36	95,070
September, 1927	39	102,374	39	101,044

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	41	91,686	68	196,424
June	20	52,884	64	210,110
May	35	96,852	44	126,027
April	32	85,685	43	132,534
March	35	75,924	47	121,106
February	27	63,696	52	147,378
January	32	83,419	52	150,260
December	34	79,353	51	142,779
November	43	103,885	66	179,841
October, 1927	69	184,154	99	290,370

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	153	547,612	131	485,817
June	152	434,811	114	428,885
May	....	.....	.....	.....
April	183	519,918	184	498,424
March	182	522,110	222	483,105
February	164	466,319	172	439,193
January	167	477,974	165	437,080
December	....	.....	.....	.....
November	248	507,775	185	429,101
October, 1927	266	573,090	202	489,442

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	147	662,437	122	454,802
June	149	567,839	141	539,600
May	174	869,626	175	625,910
April	157	580,506	150	565,111
March	179	629,773	162	648,057
February	158	501,080	165	640,220
January	145	602,389	154	607,904
December	171	665,944	158	631,872
November	139	538,160	135	578,466
October, 1927	173	630,193	162	507,386

Port Arthur

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1928	24	78,538	33	109,230
June	25	80,481	25	79,758
May	27	92,323	28	90,108
April	24	73,693	26	88,253
March	46	127,039	47	131,741
February	47	144,273	44	144,508
January	20	69,947	20	72,185
December	23	67,105	21	68,602
November	21	64,277	25	80,084
October	18	50,632	25	82,177
September, 1927	16	51,492	29	83,728

Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 44 of 152,863 net tons entered and 51 of 175,775 net tons cleared for the month of July.

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What the British Are Doing

Short Surveys of Important Activities in Maritime Centers of Island Empire

THE Blue Star liner STUART STAR 10,800 tons, the first English ship to be fitted with a British plant for burning pulverized fuel is testing the new installation on a voyage to Buenos Aires. It was carried out in record time and the vessel is due to return about the end of August.

* * *

THE Furness Shipbuilding Co. Ltd. has launched on the Tees the Canadian grain carrying steamer WILLIAM SCHUPP being one of several vessels built to the order of the Toronto Insurance & Vessel Agency of Toronto for service on the Great Lakes and River St. Lawrence. The vessel is considered a first class example of the modern canal and lake freighter. The dead weight is about 2500 tons and the propelling machinery which is located aft is being installed by Earles Shipbuilding & Engineering Co. Ltd. of Hull.

* * *

THE world's biggest ship has been ordered for the White Star line to be built by Harland & Wolff of Belfast. The keel is to be laid at once and completion is expected in less than three years. It is to cost from £6,000,000 to £7,000,000, the length 1000 feet, the breadth 100 feet and the displacement 60,000 tons, or roughly 4000 more than that of the next biggest liner. The appointments are to be in every way luxurious comprising up to date lifts, ballrooms, restaurant, winter gardens, swimming pool, gymnasium, nurseries and state rooms. Several of the details have yet to be decided.

* * *

THE latest edition of Lloyds register shows that since 1914 the increase in steamers and motor ships of 4000 tons and over has been from 3608 to 6165 of which 407 are 10,000 and above including 51 of 20,000 tons and upwards. Of the 407 vessels 232 are under the British flag, of the motor ships in existence there are 614 of 4000 tons and above, 95 are between 8000 and 9000 tons and 39 of 10,000 tons and upwards with a total of 573,105 tons.

* * *

WILLIAM Denny & Brothers Ltd. of Bumbarton, has launched the single screw passenger and cargo steamer YOMA built for service between Glasgow and Rangoon to the order of Patrick Henderson & Co., Glasgow. Her length is 453 feet, breadth 61 feet, depth 34 feet 7 inches, gross tonnage 8000 tons and 9000 deadweight on a draft of 26 feet 6 inches. She is built to accommodate 152 first class passengers and public rooms will consist of dining saloon, music room, lounge and smoke room all spacious and tastefully decorated and furnished. She is arranged to be driven either by coal or oil fuel, the most important departure from the designs of previous vessels built for the same owner being that the steering gear is of the fore ram electric hydraulic type instead of steam driven, and that the verandah accomodation has been considerably extended.

* * *

THE large majority of vessels with speeds of 12 knots and over now in course of construction are for propulsion by internal combustion engines. At present there are 133 such vessels being built, and of these only 20 per cent are for British owners. In the shipbuilding industry some concern is expressed that owners of cargo tonnage are not now building a sufficient percentage of fast vessels to maintain the foremost position which they have long held in this respect.

Ship Cars from Detroit to Barcelona

DEMAND of overseas markets for American automobiles late in May resulted in the inauguration of a new development in automotive exporting when the S. S. TRACTOR of Hamburg cleared Detroit for Barcelona, Spain, with an exclusive cargo of Studebaker and Erskine cars valued at a quarter of a million dollars.

German Steamship Tractor Loading Automobiles at Detroit for Barcelona, Spain

The S. S. TRACTOR is the first German vessel to dock at Detroit since the war, and is said to be the first vessel to carry an exclusive cargo of motor cars from Detroit direct to European ports. Passing from Lake Erie to Lake Ontario through the Welland canal,the ship followed the St. Lawrence river past Montreal and Quebec into the Gulf of St. Lawrence, thence into the North Atlantic.

Additional interest was roused by the shipment due to the fact that of the 248 cars constituting the cargo, 55 were shipped uncrated. Studebaker is the largest individual user of the unboxed method of shipping cars having inaugurated this system early in January with a shipment of 500 unboxed cars from New York to Hamburg. By eliminating the cost of crating and uncrating the cars,

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as well as the increased landed cost of crated cars due to the duty charged in many countries on the value of the box itself, considerable savings are effected for the overseas purchaser.

Inauguration of the Lakes to Europe plan of shipping motor cars recalls the fact that this manufacturer was the first to make extensive use of the Great Lakes shipping for domestic markets. Some ten years ago this company's traffic officials suggested to Great Lakes shipowners that one or two vessels be fitted with special equipment to handle the shipment of uncrated automobiles from Detroit to other Great Lake ports. After a trial voyage and the new method was pronounced a complete success, the plan was quickly followed by so many other companies that a large part of Great Lakes shipping originating in Detroit now consists of motor cars for all cities on the Great Lakes.

Safe Pressure Gages

The safety of human life often depends upon the accuracy of the pressure gage on a steam boiler or other pressure vessel which can explode. The American Engineering Standards committee has therefore been asked by the American Society of Mechanical Engineers to approve the establishment of national standards for pressure gages. The standards might provide for example for such construction that the gage could not indicate zero pressure when there is actually sufficient pressure to constitute a grave hazard if a workman should open a boiler or tank—a cause of loss of life in the past. Standardization of vacuum gages is also requested.

The Standards committee will call for a committee to do this work.

Ocean Freight Rates

Per 100 Pounds Unless Otherwise Stated

Quotations Corrected to Aug. 18, 1928 on Future Loadings

NOTE: FREIGHT RATES STEADY WITH SLIGHT CHANGE

New York to	Grain	Provisions	Cotton (H. D.)	Flour	General cargo cu. ft.	General cargo 180 lbs.	††Finished steel	REMARKS Freight Offered
Liverpool	2 shillings	$0.60	$0.40	0 20	$0.50	$0.90	$8 00T***	Fair
London	2 shillings	0.60	0.40	0.20	0.50	0.90	8.00T***	Fair
Oslo	$0 14	0.45	0 50	0 30	0.42½	0.85	8.00T	Fair
Copenhagen	0 12	0 45	0 50	0.30	0.50	1.00	8.00T	Fair
Hamburg	0 13	0 35	0 45	0.22	0.50	0.90	10.00T	Fair
Bremen	0 14	0.35	0 45	0.22	0.50	0.90	10.00T	Good
Rotterdam and Amsterdam	0.10	0.32½	0 40	0.22	0.40	0.75	9.50T	Good
Antwerp	0.09	0.32½	0 30	0.20	0.45	0.80	7.50T	Fair
Havre	0.11	0.35	0 31	0.30	0.45	0.80	9.00T	Fair
Bordeaux	0 11	0.35	0.31	0.30	0.45	0.80	9.00T	Good
Barcelona	....	0.50	0 30	10.00 bags	—12 00T—		10.00T	Fair
Lisbon	....	0 65	0 45	8.00T bags	—23.00T—		8.00T	Fair
Marseilles	....	0.65	0.40	7.00 bags	—23.00T—		8.00T	Fair
Genoa	0.14	14.25T	0.50	9.00	—23 00T—		11.50T	Fair
Naples	0.14	14.25T	0.50	9.00	—23.00T—		11.50T	Fair
Constantinople	0 27	20.00T	0 75	0 40½	—24.00T—		11.50T	Fair
Alexandria	....	20.00T	0 75	0 40½	—24 00T—		11.50T	Fair
Algiers	....	0.75	0 60	8.0T bags	—23.00T—		11.50T	Fair
Dakar	....	17.00	....	15.50T	—23.00T—		11.50T	Fair
Capetown	....	18 00	....	13 00 per 2000 lbs.	20.00		20 00	Good
Buenos Aires	....	22.00T	....	....	20.00 to 22.00T†		8.00 to 8.80T	Good
**Rio de Janeiro	....	22.00T	....	....	20.00 to 22.00T†		7.00 to 7.70T†	Good
Pernambuco	....	22.00T	....	9.00T	—22.00T—†		9.70T†	Good
Havana	0.30*	0.50	....	0.30*	0.61	1 33	10 00	Fair
Vera Cruz	0.25	0.30	0 50	0.35	0.52½	1.05	0.30 to 0.35	Fair
Valparaiso	....	1.07	....	0.70	....	....	10.00T	Fair
San Francisco	....	0.45 to 0.90	....	0.40 to 1.10	....	....	0.25 to 0-30	Very good
Sydney	....	18.00T	1.25	18.00T	18.00-24.00T		8.00 to 11.00T	Fair
Calcutta	....	....	0.60	10.00T	—16.00T—		10 00T	Fair

T—Ton. ‡Per quarter of 480 lbs. †Landed. ††Heavy products limited in length. *Extra charge for wharfage. **Plus $0.50 surcharge on all rates to Rio de Janeiro on account of congestion. ***Plus 15 per cent.

From North Pacific Ports to	Lumber Per m. f.
San Francisco	$3.75 to 4.00
South California	4.00 to 4.50
Hawaiian Islands	9.00 to 10.00
New Zealand	15.00 to 18.00
Sydney	11.00 to 13.50
Melbourne-Adelaide	12.00 to 14.00
Peru-Chile	11.75 to 14.00
South Africa	17.00 to 20.00
Cuba	14.00 to 15.00
United Kingdom	67s 6d to 70s
Baltimore-Boston range	$13.50 to 14.50
Florida Range	No rate
Buenos Aires	14.00
South America — East Coast	14.00 to 17.00
South America — West Coast	11.75 to 14.00
China	9.50 to 10.00
Japan	7.00 to 8.00
Japan (logs)	12.00 to 14.00
Atlantic—Gulf	12.00 to 13.00

Flour and Wheat	
U. K. and Continent (gross tons)	27s to 30s
Oriental Ports (net tons)	$3.50 to 4.50

NOTE: Lighterage rates on fuel in New York reduced from 6½ to 5½c per barrel. The coal strike in Britain is now settled and freight rates or bunker prices for coal or pig iron are again quoted.

General cargo rates to Havana change daily and are omitted for the time being.

Rates to Calcutta are subject to change without notice. Cotton goes only to Bombay. Landing charge of $2.00 per freight ton at Valparaiso.

Principal Rates To and From United Kingdom

	s	d		s	d
Grain, River Plate to United Kingdom	22	0	Pig iron, United Kingdom to New York or Philadelphia	12	6
Coal, South Wales to Near East	9	9	Iron ore, Bilbao to Cardiff	6	0
Coal, United Kingdom to Buenos Aires	10	9	Iron ore, Huelva to Phila. or Balto	11	0
Manganese Ore, Poti to Philadelphia	$3.50				

Bunker Prices

At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Oct. 20, 1927.	5.65	1.61	5.13
Nov. 18	5.50@5.65	1.46½	5.15
Dec. 20	5.35@5.65	1.41½	5.15
Jan. 19	5.25@5.60	1.41½	5.15
Feb. 20	5.25@5.60	1.40	4.92
Mar. 20	5.00@5.60	1.40	4.92
April 19	5.00@5.60	1.40	4.92
May 19	5.00@5.60	1.30	4.92
June 19	5.00@5.60	....	4.92
July 18	5.00@5.60	1.10	4.92
Aug. 18, 1928.	5.00@5.60	1.10	4.92

At Philadelphia

	Coal trim. in bunk per ton	Fuel oil alongside per barrel	Diesel Eng. oil alongside per gallon
Oct. 20, 1927	5.65	1.56	.....
Nov. 18	5.20@5.65	1.45@1.46	4 88@5.12
Dec. 20	5.20@5.65	1.32@1 35	4.88@5.12
Jan. 19	5.25@5.60	1.22@1.25	4.90@5.12
Feb. 20	5.25@5.60	1.21@1.25	4.90@5.12
Mar. 20	5.00@5.60	1.21@1.25	4.64@4.87
April 19	5.00@5.60	1.21@1.25	4.64@4.87
May 18	5.00@5.60	1.20@1.25	4.87
June 19	5.00@5.60	....	....
July 18	5.00@5.60	1.10	4.88
Aug. 18, 1928	5.00@5.60	1.10	4.88

Other Ports

Boston, coal, per ton	$6.76
Boston, oil, f. a. s., per barrel	1.34
Hampton Roads, coal, per ton, f.o.b., piers	$4.25 to 4.50
May 8 — Cardiff, coal, per ton	12s 9d
London, coal, per ton	—s —d
Antwerp, coal, per ton	18s 6d
Antwerp, Fuel oil, per ton	80s0d
Antwerp, Diesel oil, per ton	87s 6d
British ports, Fuel oil	67s 6d
British ports, Diesel oil	82s 6d

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Up and Down the Great Lakes

Steel Shipments—Cargo Records—Lake Levels—Repair Huronic—Rapid Cargo Discharge—Excursion Traffic—Engine Company Reorganized—Diesel Tanker Launched

STEEL shipments by boat from lower lake mills and furnaces to upper lake points have been fully up to a year ago. The movement of finished steel products from the Chicago district to Canadian points has been considerably heavier than last year. A heavy movement into Milwaukee has been made from eastern lower lake mills this season. Several cargoes of reinforcing bars alone were shipped from an eastern lake mill to Milwaukee for municipal work.

An eastern steel producer has been operating its boats from Buffalo to Chicago and Milwaukee on regular schedules of about ten days, carrying structural steel and lighter products. This schedule has been advanced from a year ago.

Chicago district scrap dealers, despite their plans to move surplus scrap into the Buffalo district this season, have been unable to develop any Great Lakes outlet, due largely to the fact that the Buffalo market for most of the navigation season has been against profitable shipments of scrap eastward.

Shipments of pig iron from Cleveland into the Chicago and Milwaukee district will be considerably smaller than a year ago. Two Chicago district brokers have been shipping occasional cargoes and several additional shipments may be made this year, although the rising pig iron market east of Chicago coupled with the low market in the Chicago-Milwaukee district precludes active shipments.

Lakes Cargo Records

The bulletin of the Lake Carriers' association for July contains a very interesting article on cargo carrying records. According to this article the Canadian steamer, LEMOYNE (largest vessel on the Great Lakes) on June 15, cleared from Fort William with a cargo of 534,300 bushels of wheat, breaking her previous record of 518,000 bushels made in 1926. This immense wheat cargo is equivalent to 14,311 long tons and it was the greatest cargo in weight that had ever passed through the locks, the previous record having been made by the COL. J. M. SCHOONMAKER with a load of 14,010 long tons of iron ore in 1920.

But the LEMOYNE on her very next trip brought down a still larger cargo, clearing from Fort William, July 6, with 546,800 bushels of wheat, equivalent to 14,646 long tons. This is the heaviest cargo ever brought down Lake Superior, exceeding by over 100 tons the previous peak record of iron ore, totaling 14,532 gross tons, carried by the DONNACONA. The article reviews some of the record cargoes in long tons carried, as follows: The DONNACONA, iron ore, 1927, from Superior, Wis., to Sault Ste. Marie, Ont., (deep water all the way) 14,532; the COL. J. M. SCHOONMAKER, iron ore, 1920, from Duluth to Lake Erie, 14,137; the HENRY H. ROGERS, iron ore, 1906, from Escanaba to South Chicago, 13,333; CARL D. BRADLEY, limestone, 1927, from Calcite to Buffington, Ind., 15,724 (this record has been exceeded this summer); and the cargo referred to above in the LEMOYNE, wheat, 1928, from Fort William to Port Colborne, 546,800 bushels, or in long tons, 14,646.

July Lake Levels

The United States Lake Survey reports the monthly mean stages of the Great Lakes for the month of July as follows:

Lakes	Feet above mean sea level
Superior	602.87
Michigan-Huron	580.41
St. Clair	575.54
Erie	572.71
Ontario	246.73

Lake Superior was 0.40-foot higher than in June and it was 0.23-foot higher than the July stage of a year ago. Lakes Michigan-Huron were 0.29-foot higher than in June and they were 0.83-foot higher than the July stage of a year ago, 0.25-foot above the average stage of July of the last ten years. Lake Erie was 0.32-foot higher than in June and it was 0.54-foot higher than the July stage of a year ago. Lake Ontario was 0.14-foot higher than in June and it was 0.72-foot higher than the July stage of a year ago, 0.53-foot above the average stage of July of the last ten years.

Grain Receipts, Buffalo

Grain receipts at Buffalo show a considerable increase this season over last. Up to Aug. 20, 102,084,000 bushels had been received compared with 93,235,000 bushels for the same period in 1927. For August up to the 20th, 14,477,000 bushels had been received as compared with 13,040,000 bushels to the same date last August.

Record Cargo Carried

Carrying the largest cargo ever transported on the Great Lakes, the steamer CARL D. BRADLEY, largest and fastest American boat, steamed into Buffington, Ind., harbor of the Universal Portland Cement Co. on July 27 with 16,033 long tons of limestone. "This is the largest cargo of any kind ever carried on the Great Lakes," said William J. McLean, captain. Immediately upon its arrival the BRADLEY, which is a self-unloading vessel, began with its own automatic electrical machinery to discharge its cargo at the rate of a ton a second. The limestone came from the Michigan Limestone and Chemical Co.'s quarry at Calcite, Mich., the largest quarry in the world, and will be used in the manufacture of cement. Loading and receiving this unusual cargo were made possible by the depth of the Calcite and Buffington harbors which are among the deepest on the Great Lakes.

Repair Steamer Huronic

The steamer HURONIC which went ashore at Lucile Island Aug. 6, was released on Aug. 17 by the combined efforts of three tugs and two steamers. She was placed in drydock at Port Arthur on Aug. 19 and it was found that she had over fifty damaged bottom plates. She will be in drydock for several weeks.

Rapid Cargo Discharge

On Aug. 13, the steamer, HARRY COULBY unloaded 13,944 long tons of ore at Ashtabula in four hours and forty-five minutes. Shortly after her discharge, the COULBY started loading coal at the New York Central docks, and took on 14,985 short tons of cargo and 404 tons of bunkers in five hours and forty-five minutes. This makes a total of 31,062 short tons handled by the two docks in ten hours and thirty minutes. The

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S. S. HARRY COULBY, largest and newest American lake freighter, is owned by the Interlake Steamship Co., Pickands, Mather & Co., operator. She was built by the American Shipbuilding Co. at the Lorain yard and came out in 1927. The owner is much pleased with her operation, and plans are under way to conduct a complete load sea trial to detemine accurately her operating efficiency.

Excursion Traffic Heavy

Summer excursion traffic on the Great Lakes is regarded by most transportation lines as satisfactory. One or two lines report passenger excursion business much above the usual traffic and from 10 to 20 per cent ahead of a year ago.

August was a good excursion month for most lines, the prolonged hot spell over most of the North Central area during the vacation season having inspired considerable of this movement. A growing tendency was noted for tourists to travel at night by boat, resuming travel by automobile during the day, particularly when vacation routes carried automobile tourists in the general territory of steamship lines on the Great Lakes.

Traffic was more brisk than usual this season from lower lake points to Mackinac Island. The Goodrich Transit Co., Chicago, which operates a cruise tour each week to the island reported a good traffic to Mackinac during August.

Company Reorganized

The Winton Engine Co., Cleveland, has recently been reorganized. Alexander Winton has been elected chairman of the board, and George W. Codrington, president of the company. The new company is formed as an Ohio corporation and owns all the outstanding capital stock and plans to acquire all the assets and business of the predecessor firm of the same name.

In addition to Alexander Winton and George W. Codrington, the officers are: A. G. Griese, New York, first vice president; Frank Shaw, second vice president; W. S. McKinstry, secretary-treasurer, and D. A. Lake, assistant secretary-treasurer. The Winton company had net sales of $1,036,894 for six months ending June 30. The annual average of profits during the last 3½ years has been equivalent to $8.34 per share on preferred stock outstanding. The Winton Engine Co. builds marine diesel engines of fine quality for yachts, tugs and smaller vessels.

Appointed to Important Shipyard Post

Albert W. Cross, for many years naval architect of the American Ship Building Co., Cleveland has been appointed assistant to the president. The appointment went into effect in July. Mr. Cross is probably one of the best known shipbuilders on the Great Lakes. As one of the leading members of the staff, of this, the largest shipyard on the Great Lakes, he has come into contact with practically every vessel owner and operator. His ability and his genial and straightforward personality has won for him many friends and his success in his new position is taken for granted.

Albert W. Cross

Assistant to President, Am. Ship Building Co.

He started to work as a boy at the plant of the American Steel Barge Co., Superior, Wis. When this plant was taken over by the then newly organized American Ship Building Co. in 1899 he became an employe of the latter company and came to Cleveland in the fall of 1899; entering the hull drawing office as a junior draftsman. He worked with exceptional application, in the meantime studying the technical features of ship design. His industry, ability and technical grasp of the problems involved received recognition and on Jan. 1, 1908 he was appointed chief draftsman. Less than two years later in Oct. 1909 he was made naval architect.

During the great war, when every yard was working far beyond its normal capacity, Mr. Cross was appointed assistant to the operating manager and he, in conjunction with Mr. J. C. Workman for the machinery, was directly responsible for the building and delivery of a great fleet of merchant ships to the Emergency Fleet Corp. Though for the time being a naval architect was appointed to take over the details of that work, he was also responsible for the design of these ships.

In the twenty-nine years that he has been connected continuously with the American Ship Building Co. this company at its various plants has turned out a total of something like 690 vessels, all of which he has had some part in building; in the last twenty years a very important part as naval architect. Mr. Cross is married, has two children and lives in Lakewood, O. One of his hobbies is fishing and when the opportunity offers he goes up to the Lake Superior country that he knew so well when he was a boy. His many friends all wish him continued success in his new position with its added responsibilities and larger sphere of action.

J. E. Steinman Promoted

John E. Steinman who has been superintendent of the Lorain yard of the American Ship Building Co. has been appointed general superintendent of the company and will be in charge of the operation of all of the plants of the company. Mr. Steinman is a thoroughly experienced shipbuilder and has made a notable record for efficiency at the Lorain yard.

A little over a year ago, six large freighters were under construction in some stage at the Lorain plant. All of this work was finished under his personal supervision. His promotion in charge of all the plants of the company will give him a larger scope for the application of his ability and experience.

Maj. W. J. Macdonald Dies

Maj. William J. Macdonald, supervising inspector in the fourth district, St. Louis, for the United States steamboat inspection service died late in July in that city. He served for years on the Great Lakes and became chief engineer, joining the steamboat inspection service, first at Detroit. During the war, Major Macdonald took a prominent part in directing steamship operations for the war department. He was also engaged in the work of returning chartered ships to their civilian owners after the hostilities. Inspector General Dickerson N. Hoover and Capt. N. B. Nelson, supervising inspector for the Cleveland district, attended the funeral of Major Macdonald which took place at Detroit, Aug. 3.

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Build Large Steel Barge for Wharf Boat

One of the largest steel barges ever made, to be used by the city of Burlington, Ia., as a wharf boat for the Federal Barge line, has been launched in the Mississippi river at East St. Louis, by the St. Louis Structural Steel Co.

The barge cost about $60,000 and has been under construction for four months. It is 214 feet long, 45 feet wide and contains 30 watertight compartments, making it practically unsinkable. There are more than 80,000 steel rivets in the barge.

Airplane Is Used

Desiring to make a quick trip to Cleveland to inspect some work to be done on the steamer, JOHN A. KLING, A. L. Pitz, general superintendent of the Manitowoc Shipbuilding Corp., left Manitowoc in his plane, 3 p. m., landing at Cleveland airplane field at 7 p. m. After a brief period of inspection of the steamer, Mr. Pitz left for Manitowoc with information so that the work necessary was carried out at the yard pending the arrival of the steamer. A mechanic accompanied him.

On July 27, Willard J. Blake, president and general manager of the White Star Tug line died suddenly at his home in Buffalo. His death was entirely unexpected as he had not been ill. He was 50 years old and the son of Capt. Joseph Blake who founded the White Star line which at one time was the largest towing firm on the Great Lakes, operating 28 tugs. Mr. Blake was very well known to vessel owners and captains on the Great Lakes.

Diesel Tanker Completed

Twin Screw—For Great Lakes Service

DELIVERY is expected about Sept. 1 of the new twin screw diesel tanker, MARTHA E. ALLEN, built by the American Ship Building Co. at the Lorain, O., plant for the Lake Tankers Corp. This vessel, a fine modern tanker, follows in general design ocean practice. She was launched at Lorain, O., June 9. Official figures give her a gross tonnage of 2935 and a net tonnage of 1994.

General dimensions are: Length overall, 344 feet, length between perpendiculars, 334 feet; beam, 51 feet; depth, 18 feet 6 inches. The load draft is 16 feet 6 inches and the capacity in fresh water on this draft is 3700 long tons of oil.

Accommodations are provided aft for the chief engineer, four asistant engineers and seven men of the engine room crew. The captain and fourteen officers and men are accomodated forward. All officers and crew's quarters are particularly roomy, well ventilated and comfortable. The galley and mess room are located aft. There is one well equipped owner's room forward. This tanker has been built for service on the Great Lakes for the distribution of oil products, in bulk, such as gasoline and kerosene particularly.

In one respect for her type, this vessel is unique on the Great Lakes; she is the first tanker to be equipped with diesel engines. Her main motive power consists of two 700 brake horsepower each, four cycle, single acting diesel engines. The rated horsepower is developed at 150 revolutions per minute. The engines are located aft and are each direct connected to a propeller. There is one 100 brake horsepower, auxiliary diesel engine generating set. The electric generator is furnished by the Diehl Mfg. Co.

For supplying steam for most of the auxiliaries both on deck and below and for heating there is one donkey boiler of scotch type, 10 feet in diameter by 12 feet long. This boiler is fitted with two 38-inch Martin type furnaces. The total heating surface is equal to 916 square feet. Each furnace is fitted to burn oil. Also the exhaust from the main engine is carried into the furnaces. This gives sufficient heat to make steam, when the vessel is under way, for heating all quarters and for heating coils.

Before delivery to the owner the MARTHA E. ALLEN is to be given a thorough sea trial by the builder. A sustained speed of 10 knots is guaranteed and this it is expected will be somewhat exceeded. The vessel has been built under the personal supervision of the owner's representative. A. W. Cross, naval architect and J. C. Workman, chief engineer have been in charge of the work for the shipyard.

Ship Less Coal and Ore Than Last Year

According to a report issued by Maj. P. C. Bullard of the United States Engineer office at Duluth, coal receipts at the head of the lakes for the first three months totaled 320,247 tons of hard coal and 4,407,956 tons of soft coal. This is a decrease in hard coal of 113,322 tons and a decrease of 2,553,052 tons in soft coal as compared with last year. It seems likely that as the season progresses there will be more call for coal tonnage to make up this deficiency.

For this season to Aug. 1 about 11 per cent or 3,104,521 tons less ore was shipped on the Great Lakes compared with the same period last year. Up to Aug. 1, 1927, 26,380,505 tons had been moved for that year while up to Aug. 1, this year only 23,275,984 tons has been moved. However, for July of this year an increase is shown, as 8,980,859 tons of ore moved from the Lake Superior district, which is an increase of 371,777 tons over July, 1927.

J. T. Webster, vice president of the Great Lakes Engineering Works, has returned to Cleveland, where his office is located, from a two months' trip to Europe. It was the first long vacation Mr. Webster has taken in many years. He returned to Montreal on the liner DUCHESS OF ATHOL.

New Company Formed

A company known as the Channel Steel Hull Corp. has been organized in Cleveland to develop the practical application of channel steel construction for ship work, under the patents issued to W. G. Bartenfeld on the system for channel steel and plate construction for vessels and channel steel hopper construction for vessels. A number of well known Great Lakes vessel men are interested in the company. The office of the new company is located in the Rockefeller building, Cleveland.

W. G. Bartenfeld, formerly connected with the Channel Steel Barge Co., Rome, N. Y., the pioneer builders of channel steel barges, is vice president and manager.

Made Cleveland Manager

Succeeding William G. Fitch, who was appointed Pacific Coast general passenger agent, Robert E. Good, cabin manager for the United States lines in London for the past six years, has been appointed to take charge of his company's office in Cleveland.

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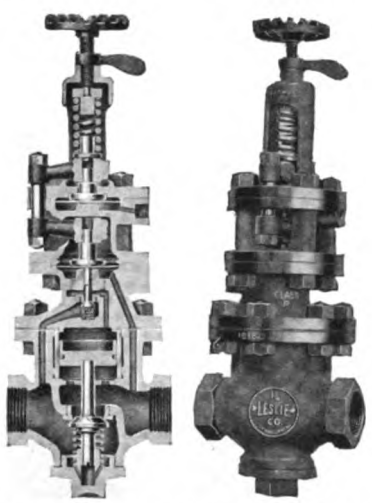
Equipment Used Afloat, Ashore

Pressure Regulator — Vertical Compressor — Asphalt Coating — Adjustable Spray Gun—Movable Swing Crane—Cutting Blowpipe—Packingless Valve

DEMAND for pumps and pump regulators is probably greater in the marine field than in any other. One reasonably large vessel requires numerous pumps for many purposes and some manner of regulating them is extremely essential in efficient ship operation. An interesting improvement in pump regulators has been developed by Leslie Co., Lyndhurst, N. J. Their line of pressure regulators and reducing valves has been favorably known in the specialty field for many years, and this addition is characteristic of the high quality products offered to the trade.

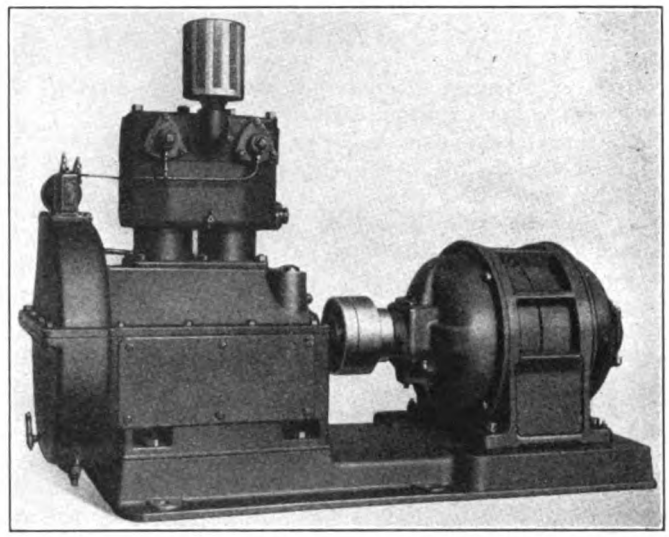
The design of the Leslie pump pressure regulator is based upon the same principle as the Leslie pressure regulator or reducing valve and has a wide pressure range in maintaining constant pump discharge pressures.

In its operation the pump discharge pressure acts on the top diaphragm against the adjusting spring. Any movement of the top diaphragm is transmitted through crossheads and connecting rods to controlling valve, which admits high pressure steam to top of piston opening main valve sufficiently to pass the required amount of steam to maintain the desired pump discharge pressure. The controlling valve is extremely sensitive, responding to the slightest change in pump discharge pressure. This insures instantaneous action of the regulator and ample operating force under the widest and most sudden variations in load. The main valve is single seated, insuring tight seat when pump is idle.



INTERIOR AND EXTERIOR VIEWS OF NEW LESLIE PUMP PRESSURE REGULATOR

This regulator is self-contained, very compact and has no stuffing boxes. It is fitted with renewable wearing parts and is built very ruggedly. Its stability is an outstanding feature.



This electric motor driven double-cylinder air compressor is intended for use where relatively little air is needed and where compactness, continuous operation, portability and automatic control are important

Vertical Air Compressor Is Compactly Built

Suitable for use in the marine field for operations requiring the use of compressed air, a vertical direct-motor driven air compressor has been introduced by Sullivan Machinery Co., Chicago, Ill. This compressor is designed for industrial and marine requirements in which a relatively small amount of compressed air is needed and in which compactness, continuous operation, portability and practically automatic control are important factors. This new unit is shown in the accompanying illustration.

The two compressor cylinders are cast to one block and bolted to the crankcase. A one-piece cylinder head is bolted to the top of the block. A special type valve, standard on all compressors made by the company, is used for both inlet and discharge. An air filter is attached to the intake opening, which removes dust and solid matter from the air. The crankcase is a massive casting, supported on the base on planed shoulders which extend the full length of the compressor. It carries two bearings with strongly bolted caps for supporting the crankshaft, and has large oil channels to the bearings.

The compressor and motor shafts are connected by a special flexible coupling, consisting of a pinion on the end of the compressor shaft which meshes around its entire circumference with an internal gear, attached to the motor shaft. The pistons are the hollow or automobile type and are made of a special grade of iron carefully annealed. The cylinders of the compressor are cooled by water jackets.

To maintain a constant air pressure, these compressors are provided with an unloading device which regulates the pressure to within 5 pounds of the desired amount.

New Asphalt Coating for Marine Use

To provide for wider and more convenient uses of asphalt paint for marine purposes and in marine construction work, an entirely new form of asphalt coating has been developed by research chemists and engineers. Announcement of this new manufacturing process has just been made by E. I. du Pont de Nemours & Co., Wilmington, Del.

Unlike all former methods of manufacturing asphalt paint in which solvents and cut-back ingredients were used, the new process consists

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of emulsifying asphalt with water and adding chromium salts. The purpose of the salts is to render ferrous metal "passive" to corrosion while the water content of the asphalt chromate emulsion dries out, leaving a highly protective coating of asphalt.

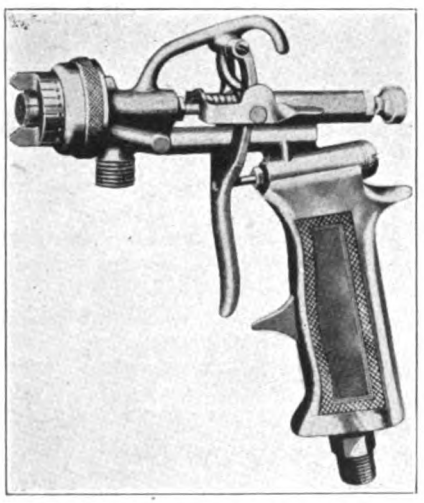
Coats of the emulsion are applied cold, and either a brush or a spray gun may be used. A further advantage claimed is that, owing to the absence of any toxic fumes or explosive vapors, the emulsion may safely be applied in confined spaces.

Uses for which this paint is recommended include the painting of decks, pumps, tanks, chair lockers, boilers, coal bunkers, brine coils and rudders. In the marine construction field, asphalt chromate emulsion will be used for coating cofferdams, pier planking and other purposes to prevent dry rot and to retard decay caused by contact with fresh or salt water.

Adjustable Spray Gun Is Efficient

A new paint spray gun incorporating two new features has been recently designed by Alexander Milburn Co., Baltimore.

The first is a dialed head which gives numerous different spray adjustments from a circular spray to



ADJUSTABLE PAINT SPRAY GUN

a fan of a wider field than has heretofore been possible. The dialing permits the operator to obtain the desired spray without making tests.

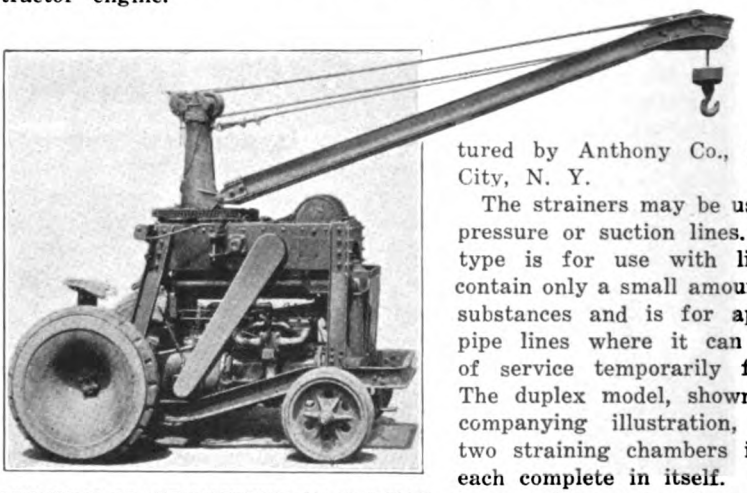
The second feature is a series of indicator numerals on the paint valve plunger. A pointer is operated as the user turns the adjustment button. Just as the dial in the head produces the exact spray wanted, so the indicator numerals on the plunger provide the exact volume without testing.

The operator, having found a certain class of work is best performed when the indicator points to a certain figure, makes the proper adjustment before beginning to spray. This improved gun is shown in the accompanying illustration. The new features have been designed in such a way that they may be used on a previous gun manufactured by the company. The new air control valve and the plunger have been made interchangeable.

Movable Swing Crane for Shipyard Use

A new sturdily built swing crane suitable in the marine field as a necessary part of the equipment of piers, shipyards, yacht basins and repair shops, is manufactured by Frederick H. Poor Inc., New York city.

This crane as it is mounted on a Fordson tractor moves from place to place under its own power and at the same time derives its load lifting and swinging power from the tractor engine.



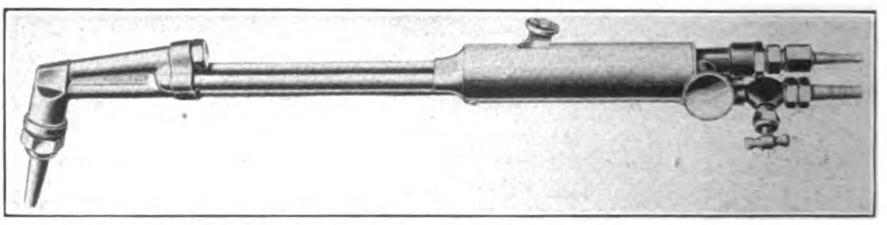
SWINGING CRANE MOUNTED ON TRACTOR

In designing the crane, thorough consideration was given to providing stability and sturdiness in a movable unit. To this end specially weighted wheels are employed at both rear and front to counterbalance loads in suspension from the boom and broad tires sustain the loads without undue tire loading. The frame upon which the mast is located consists of a fabricated plate and channel structure secured at the rear to the axle housing and is suspended at the front in such a way as to compensate for irregularities in the floor or roadbed. The swinging boom is constructed of two steel channels and has a reach of 10 feet. The bull wheel by which the boom is swung about the mast is power driven by a chain and sprocket, giving a full swing arc of 240 degrees, or 120 degrees either side. By means of an expanding brake, the boom can be set in any fixed position. All controls are within easy reach of the operator.

Blow-Out Arrangement on Strainers

In marine power plants and auxiliary units and in systems conveying fuel oil, water, steam, etc., some facility for elimination of the dangers resulting from dirt in the passages must be provided. Single and duplex strainers in new types, designed especially for oil-burning systems and conveying systems are being manufactured by Anthony Co., Long Island City, N. Y.

The strainers may be used either on pressure or suction lines. The single type is for use with liquids which contain only a small amount of foreign substances and is for application to pipe lines where it can be cut out of service temporarily for cleaning. The duplex model, shown in the accompanying illustration, consists of two straining chambers in one body, each complete in itself. One quarter turn of the cock handle cuts out either chamber as desired, thereby permitting the liquid to flow through only one chamber at a time. The direction of flow is from the outside to the inside of the baskets, so that the sediment collects in the reservoirs which surround them. The baskets or straining material are made of commercial mesh of suitable size. Drain con-



EITHER HIGH OR LOW PRESSURE NOZZLES MAY BE USED WITH BLOWPIPE

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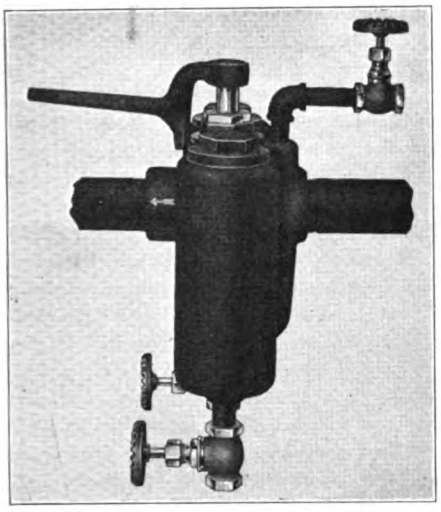
nections are provided at the bottom of the device for removal of accumulated sediment. One of the advantages claimed for the device is the blow-out arrangement by which the chambers can be purged and the baskets blown free of obstructions without interrupting the normal flow of the liquid. The strainers are made in three sizes with ½-inch, 2-inch, and 4-inch inlets and outlets.



IMPROVED DUPLEX STRAINER

Engine Driven Welder Aids Production

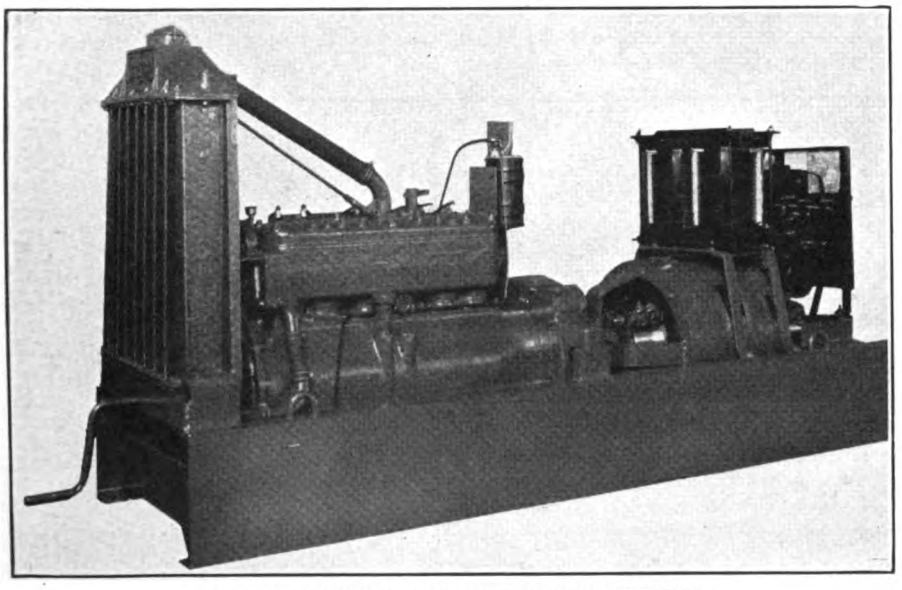
Welding plays an extremely important part in the various stages of shipbuilding and an improved welding process very definitely leads to greater facility of construction. A new 300-ampere gasoline engine welder has been brought out by the Lincoln Electric Co., of Cleveland. The 300-ampere rating of the generator is in accordance with N.E.M.A. standards, has a current range of from 75 to 400 amperes for metallic electrode welding, being direct connected to a six-cylinder Buda engine operating at 1500 revolutions per minute.

The engine has an S.A.E. rating of 227.3-horsepower, develops a brake horsepower of 41 at its operating speed and it said to be economical in fuel consumption. Fire hazards are eliminated by the location of the gas tank in the channel iron frame under the engine.

The generator has the laminated magnetic circuit with separately excited field, stabilizer, variable voltage and steel contruction features embodied in the line of staple arc welders made by the company.

Overall dimensions are 93 inches long, 35 inches wide and 45 inches high. Both units are mounted on a welded steel base which insures maximum strength and rigidity with minimum weight.

This equipment has been designed to meet a demand for a larger electrode in welding and it is claimed that the six-cylinder process affords a smooth even flow of power so necessary for successful welding.



NEW 300-AMPERE GASOLINE ENGINE WELDER

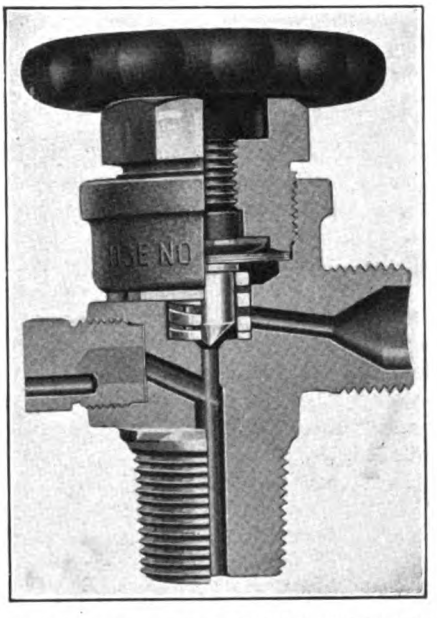
Eliminates Tube Bends in Cutting Blowpipe

A new cutting blowpipe, which it is claimed will not backfire under severe operating conditions, has been introduced by the Oxweld Acetylene Co., 30 East 42nd street, New York. Although this blow pipe uses the same nozzles as a line previously manufactured by that company, several changes in design have been made. The three gas tubes are straight, having no bends either outside or inside the handle. The cutting valve is of the same design as has been used by that company for many years. Interchangeable nozzles are provided so that the blowpipe may be used with either medium or low pressure acetylene. The medium pressure nozzle cannot be used with low pressure acetylene although the low pressure nozzle can be used with medium pressure acetylene supply if low pressure is maintained in the hose and blowpipe.

Packingless Valve Is Used for High Pressures

A packingless valve for use in marine work has been developed by the International Oxygen Co., Newark, N. J. This valve is designed for operations employing high pressure oxygen, hydrogen, nitrogen, helium, compressed air and other gases. The accompanying illustration shows the cross section of the valve.

The body is drop-forged brass; the stem is of heavy rolled brass; while the spring around the stem is of bronze, capable of lifting the stem against 3000 pounds pressure. The multiple diaphragm arrangement is said to increase diaphragm life 1500 per cent. An interesting feature of the valve is the safety device, a small plug containing a frangible disk designed to break at 2600 to 2800 pounds pressure. This disk is supported by fusible metal having a melting point of 212 degrees Fahr. Advantages claimed for the valve are: A low repair and maintenance cost; rugged mechanical construction and simplicity, resulting in leaks being practically eliminated; easy and positive operation; and a greater factor of safety.



CROSS SECTION OF PACKINGLESS VALVE

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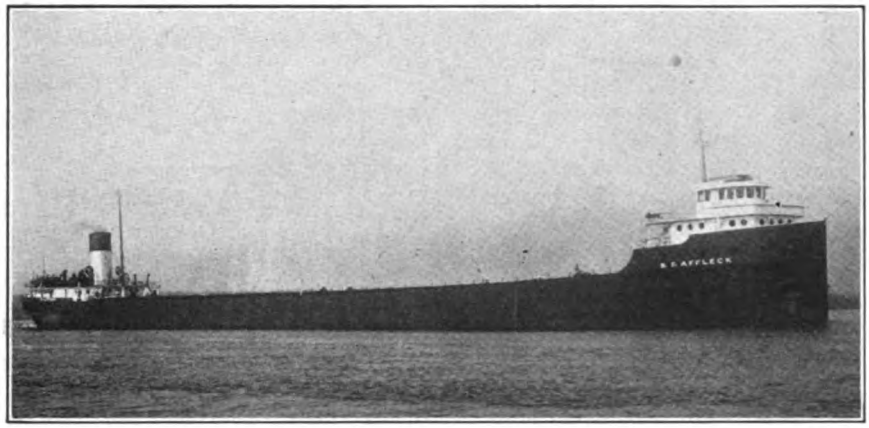
Lake Freighter B. F. Affleck



Steamer B. F. Affleck—Great Lakes Ore, Coal, Stone or Grain Carrier

THE B. F. AFFLECK, one of the two new standard ore carriers added to the Pittsburgh Steamship Co.'s fleet last year, was built by the Toledo Shipbuilding Co., Inc., Toledo, O. This vessel was launched June 25, and completed Aug. 27, 1927. She was built to the classification of Lloyds. After completion late in August the AFFLECK was immediately entered in service. Though a regular standard ore carrier she is about equally suited to carrying coal, stone or grain. Part of her service last season consisted in carrying limestone to Buffington, Ind. for the plant of the Universal Portland Cement Co. She operated in a very satisfactory manner and the owner is very well satisfied.

The general particulars of the B. F. AFFLECK are as follows: Length over all, 604 feet; length between perpendiculars, 580 feet; breadth molded, 60 feet; depth molded, 32 feet; draft loaded, 20 feet; displacement loaded, 19,000 tons; gross tonnage, 8045 tons; net tonnage, 6530 tons; cargo capacity, 12,000 tons of 2240 pounds each; cargo capacity cubic feet, 539,430; bunker fuel capacity, short tons, 440; speed, 12 statute miles per hour.

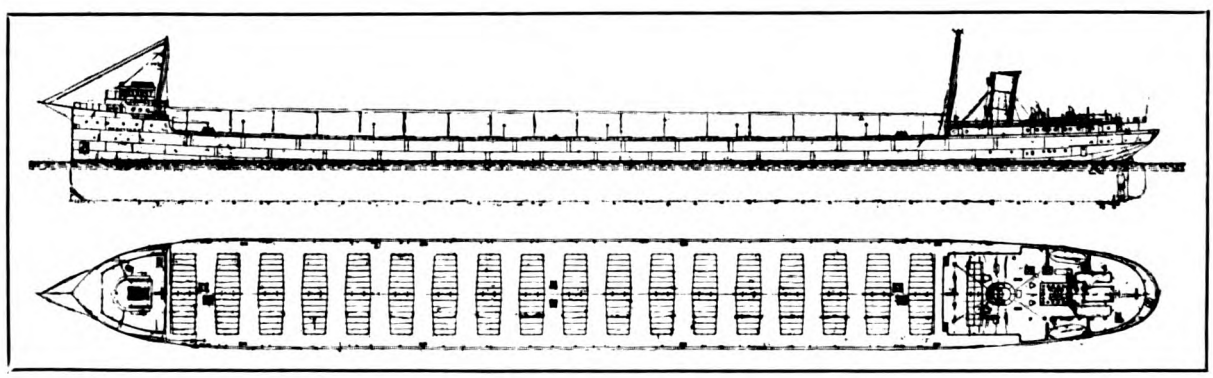
The machinery of the AFFLECK is of the usual standard conservative Great Lakes practice for this type of vessel. One triple expansion reciprocating steam engine built by the Toledo Shipbuilding Co., Inc. furnishes the motive power. Cylinder diameters are 24½ x 41 x 63 inches and the stroke is 42 inches, giving an indicated horsepower of about 2200 at 85 revolutions per minute. Steam is supplied by three single ended, scotch marine boilers also built by the Toledo Shipbuilding Co., Inc. These boilers are 14 feet in diameter and 12 feet long. The total heating surface is 8001 square feet and the working steam pressure is 190 pounds per square inch. Hand fired coal is used as fuel.

Auxiliaries of the usual kind for a vessel of this type are installed. The various pumps are of Dean, Union and Kingsford make. Steam windlass, steering engine and winches were furnished by the Hyde Windlass Co. The propeller and the spare, both solid and of cast iron, were made by the shipyard. There is ample refrigerating capacity in the two-ton Phoenix refrigerating machine. For electric light and other power purposes there are three electric generators each of 15 kilowatts capacity built by the Crocker Wheeler Co. The thrust bearing is of the Kingsbury self-aligning type. A Sperry gyro compass is fitted.

It may be said that the steamer, B. F. AFFLECK is a standard type of Great Lakes bulk freighter with minor improvements and refinements and that she was carefully built. The cargo hold is divided into three compartments into which open 18 hatches of the sliding cover type. Her propelling machinery is located aft. Quarters for the crew occupy the spar deck at both ends of the vessel.

This vessel is built partly on the longitudinal system of framing in that she has fore and aft double bottom floor channels and certain other features of similar construction in the deck stringers. The rest of the vessel is built on the transverse system with sloping side tanks. The hatches measure 12 feet in a fore and aft direction and 38 feet athwartship. They are spaced 24 feet between centers. The double bottom is 66 inches deep and at the sides rises to the main deck level. This double bottom is divided into seven watertight compartments and its total capacity is about 7500 tons of water ballast.

Accommodations for officers and crew are in the houses at the ends of the vessel. The quarters are substantial and sanitary and are well lighted and ventilated. The AFFLECK is equipped throughout with all auxiliaries necessary for efficient operation as a Great Lakes bulk freighter.



Deck Plan and Outboard Profile of the Steamer B. F. Affleck Owned by the Pittsburgh Steamship Co.

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Late Flashes On Marine Disasters

Brief Summaries of Recent Maritime Casualties— A Record of Collisions, Wrecks, Fires and Losses

Name	Date	Nature	Place	Damage Resulting
Alaunia	Apr. 18	Collision	River Thames	Starboard side
Arundale	Apr. 5	Collision	Buenos Ayres	Damaged
Apolo	Apr. 5	Collision	Buenos Ayres	Damaged
Arthur	Apr. 5	Collision	Rotherhithe	Sank
Achudi	Apr. 9	Collision	Gijon	Not stated
Antwerp	Apr 8	Collision	River Elbe	Not stated
Ashcroft	Apr. 19	Sank	Off Hull	
Arcadia	Apr. 20	Fire	Piraeus	Badly
Argyll	Apr. 18	Collision	Los Angeles	Considerable
Asgard	Apr. 24	Disabled	Havre	Leaking
Ansaldo	Apr. 25	Collided quay	Rome	Bows
Alchymist	Apr. 27	Disabled	Amsterdam	Boiler
Algol	May 3	Aground	Barry	Not stated
Bergsdalen	Apr. 19	Collision	Panama Canal	Plates
Bon Homme	Apr. 29	Abandoned	East of Boston	
Bronte	Apr. 30	Collision	La Plata	Damaged
Bacchus	May 4	Collision	English Channel	Not stated
Benwell Tower	Apr. 4	Disabled	Gibraltar	Steering gear
British Ambassador	Apr. 12	Collision	Firth of Forth	Bows
Bonny	Apr. 12	Ashore	East of Cape Palmas	Leaking
Beljeanne	Apr. 15	Ashore	Nr. Gluckstadt	Floated
Brabant	Apr. 20	Collided bridge	London	Superstructure
Black Point	May 10	Disabled	Boston	Tail shaft
Belfort	Apr. 25	Sank	Nr. Fernando Noronha	
Bronte	Apr. 30	Collision	La Plata	Damaged
Branksea	May 3	Disabled	Tyne	Boiler
Charles S. Hebard	May 10	Collision	Soo River	Damaged
Commercial Mariner	Apr. 13	Collision	South Pass	Damaged
Corozal	Apr. 13	Collision	South Pass	Damaged
Commercial Courier	Apr. 28	Aground	Off North Point	Floated
Chas. G. Black	Apr. 29	Aground	South Pass	Not stated
Callisto	Apr. 29	Ashore	Nr. Louisburg	Wrecked
Calicut	Apr. 4	Ashore	Kilindini	Total loss
Chepita	Apr. 5	Explosion	Willemstad	Hull; deck
Caroline	Apr. 5	Collision	Antwerp Roads	Damaged
Corinthic	Apr. 5	Fire	Hamburg	No. 3 hold
Caracoli	Apr. 7	Fire	Port au Prince	Not stated
Cormorant	Apr. 17	Collision	Off Millwall Dock	Stern
Charente	Apr. 23	Disabled	Rotterdam	Machinery
Chile	Apr. 23	Disabled	Hamburg	Motor
Clan Macintosh	Apr. 26	Fire	Rotterdam	No. 3 hold
Conte De Flandre	Apr. 25	Ashore	Genoa	Not stated
Caterina Accame	Apr. 27	Collision	Nr. Vlaardingen	Not stated
Cherca	May 8	Aground	Torre Annunziata	Floated
Chinshan	Apr. 30	Collision	Tientsin	Waterlogged
Cordale	May 3	Collision	Off Dungeness	Not stated
Dorothea	Apr. 18	Disabled	Bastia	Steering gear
Durour	Apr. 25	Ashore	New Guinea Reef	Plates
Eads	Apr. 24	Stranded	West Neebish Chan.	Leaking
Emperor of Montreal	Apr. 26	Stranded	Cape Negro	Floated
Eric Larsen	Apr. 2	Struck Wreck	Off Dover	Main Shaft
Emily	Apr. 16	Collision	North Woolwich	Ashore
Francis Kelly	Apr. 26	Sank	New Brighton, S. I.	
Falco	Apr. 2	Collision	River Parana	Not stated
Famiglia Merica	Apr. 10	Disabled	Falmouth	Leaking badly
Frank H. Buck	Apr. 19	Aground	San Francisco	Floated
Fernfield	Apr. 30	Fire	Halifax	Damaged
Gibraltar	Apr. 20	Collision	Pensacola	Damaged
Giglio	Apr. 5	Ashore	Nantes	Machinery
Gertrud Rask	Apr. 16	Disabled	Copenhagen	Lost prop.
Genisori	Apr. 25	Fire	Punta Piedade	Not stated
Giorgio	Apr. 30	Disabled	Willemstad	Not stated
Gloucester City	May 1	Collision	River Mersey	Not stated
Helen Barnet Gring	Apr. 26	Collision	Off Chatham	Leaking
Hweian	Apr. 4	Collision	Tientsin	Starb'd side
Horai Maru	Apr. 10	Ashore	Shimonoseki Strait	Not stated
Hannah	Apr. 19	Ashore	Jarrow Slake	Floated
Ioannis Fafalios	May 4	Collision	English Channel	Sank
Indianic	Apr. 19	Disabled	So. of Durban	Lost prop.
Inverampton	Apr. 21	Ashore	Maracaibo	Abandoned
Indianic	Apr. 26	Stranded	Norrkoping	Plates; frames
Invergrange	May 2	Collision	Hull	Not stated
Jersbek	Apr. 14	Ashore	Nr. Oran, Scotland	Floated
Koningen Elizabeth	Apr. 5	Collision	Rotherhithe	Not stated
Kaiju Maru	Apr. 11	Collision	Dairen	Damaged
Kingfisher	Apr. 12	Ashore	Mossel Bay	Not stated
Kingsdon	May 1	Disabled	Pernis, Cagliari	Boiler
Lavaldoc	May 10	Collision	Soo River	Plates, frames, forepeak
Lovett Queen	Apr. 14	Disabled	Thatchers Island	Not stated
Lackawanna	Apr. 21	Collision	Vineyard Sound	Not stated
Lassell	Apr. 13	Aground	Southend-on-Sea	Not stated
Lago Maracaibo	Apr. 18	Ashore	Gulf Venezuela	Not stated
Leo Le Blanc	Apr. 28	Hvy. weather	Yarmouth	Sails; hull
Louise B. Marshal	May 2	Ashore	St. Johns Island	Floated
Lutana	May 1	Collision	Off Port Phillip Hds.	Damaged
Lanrick	May 1	Collision	London	Damaged
Montrose	Apr. 9	Collided iceberg	St. John	Stem; bows
Mystic	Apr. 21	Collision	New York	Not stated
Mary M. Purdy	Apr. 20	Fire	Off Clason Pt.	Badly
Malacca	Apr. 24	Collision	Off Staten Island	Stem
Mai	Apr. 21	Stranded	Antigua	Floated
Mandu	Apr. 23	Disabled	Barbados	Engine
Montana	Apr. 28	Aground	Off North Pt.	Floated
Mariston	Apr. 30	Collided pier	Brooklyn	Port side
Mersington Court	May 3	Disabled	River Tyne	Machinery
Magne	Apr. 8	Collision	River Elbe	Stem
Munamar	Apr. 9	Fire	Havana	Nos. 3 and 4 holds
Mourao	Apr. 11	Ashore	Oporto	Bottom
Macharda	Apr. 13	Fire	Hull	Nos. 6 and 7 holds
Montreal	Apr. 16	Collision	North Woolwich	Sank
Magdala	Apr. 19	Fire	Greenock	Engine room
Melpomene	Apr. 19	Ashore	Cette	Floated
Meta	Apr. 22	Collision	Off French Coast	Sank
Mexican	May 10	Struck obj.	New York	Bottom
Marie Edmee	May 8	Not stated	Off Newfoundland	Wrecked
Monksville	May 1	Collision	River Mersey	Damaged
Nova Queen	Apr. 13	Disabled	Boston	Damaged
Norwich City	Apr. 24	Struck bridge	Vancouver	Damaged
Neptune	Apr. 2	Collision	Tientsin	Not stated
Oritani	Apr 25	Disabled	Marcus Hook	Machinery
Overbrook	Apr. 26	Explosion	Off Florida Coast	Sank
Overton	May 2	Collision	Off Silvertown	Starboard side
Pacific Trader	Apr. 24	Disabled	Panama Canal	Machinery
Polemis	Apr. 3	Stranded	Nr. Porto Corsini	Stern, frame
Polsella	Apr. 12	Collision	N. W. Dudgeon	Sank
Paringa	Apr. 19	Fire	Port Adelaide	Not stated
Posillipo	Apr. 16	Aground	Bahia	No. 2 & 3 holds
Rose Anne Belliveau	Apr. 23	Gale	Off Brown's Bank	Leaking
Richfield	Apr. 28	Explosion	San Francisco	Not stated
Rensfjell	Apr. 30	Disabled	St. Johns	Steer. gear
Rubens	Apr. 18	Stranded	Off Isle of Pines	Floated
Rowena	Apr. 26	Ashore	Gulf of Suez	Floated
Rene	May 2	Collision	Hull	Not stated
Svithoid	Apr. 13	Disabled	Lat. 46N., Long. 39W	Machinery
South Shore	Apr. 28	Ashore	So. of Atlantic City	Not stated
Shirley M. Clattenburg	May 11	Collision	Off South Portland	Damaged
Sundance	May 2	Disabled	Savannah	Engine
Swinburne	May 7	Collision	New York	Port side
Shin Ping	Apr. 2	Disabled	Tientsin	Prop. shaft
Sovet	Apr. 5	Aground	Kiel	Not stated
Sternvik	Apr. 12	Collision	Firth of Forth	Sank
Sunbeam	Apr. 11	Collision	Off Morocco Wharf	Lee board; decking
Sitges	Apr. 17	Disabled	Off Malta	Machinery
St. Joachim	Apr. 22	Collision	Off French Coast	Not stated
Steelmaker	May 9	Disabled	Tutuila, Samoa	Leaking
Two Brothers	Apr. 21	Aground	Rockaway Pt.	Total loss
Tom	Apr. 2	Collision	Wapping	Starboard side
Tiber	Apr. 22	Disabled	Riga	Propeller
Tirso	Apr. 25	Aground	Dakar	Not stated
Tashmoo	May 7	Disabled	Off Salina Cruz	Machinery
Upminster	May 1	Collision	London	Sank
Venezuela	May 4	Collision	San Francisco	Plates; frames
Woonsocket	Apr. 12	Disabled	Newport	Lost prop.
William Booth	Apr. 26	Collision	Off Chatham	Sank
Whitby Abbey	Apr. 12	Collision	N. W. Dudgeon	Not stated
Waal	Apr. 23	Ashore	Frederickshavn	Floated
Zannis Pandelis	Apr. 1	Aground	St. Vincent	Floated
Zurriola	Apr. 13	Collided jetty	Barry	Bow plates

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Personal Sketches of Marine Men

Capt. Eugene E. O'Donnell, Elected President of the Eastern Steamship Lines Inc.

By H. R. Simonds

EXPERIENCE for many years as master of freight and passenger vessels has given him an excellent background for the business of managing shipping enterprises.

HE BUILT up the American Republics line into an efficient and prosperous fleet, plying regularly between the East coast of South America and the United States.

HIS services have always been at the call of his native city and he has done much to increase interest in, and activity at, the port of Boston.

RECOGNITION of Capt. Eugene E. O'Donnell's unusual ability in the management of marine shipping enterprise is evident in his recent appointment to the presidency of the Eastern Steamship Lines, Inc. Born in the old North end district of Boston, he grew up in intimate association with the life of the docks and of the sea. While attending public school in Boston, he worked at odd times on the tow boats in the harbor and after leaving school he took a permanent job on one of these harbor tugs. From this work he graduated to the line of ships operated by the Standard Oil Co. along the north Atlantic coast. He worked in various capacities in this service for several years, and then added to this experience four or five years with the Boston and Philadelphia line. After this, he helped to manage several ice breakers operating out of Philadelphia.

At the age of 25 he was considered an experienced and thoroughly tried manager of ships. In 1908 he joined the Metropolitan line and advanced rapidly to take his first formal command as master of the H. F. DINNOCK, a freighter operating between New York and Boston. Later he became master of the passenger steamship HARVARD and afterward of the passenger steamship MASSACHUSETTS. Both of these operated in the New York and Boston service.

In 1912 he was appointed by President Wilson to the United States steamboat inspection service as supervising inspector of the fifth district. This district includes the ports along the New England coast from Bangor, Me., to New London, Conn. It was while in this service that Captain O'Donnell's vital interest in the Port of Boston was aroused. Working with the chamber of commerce, he was largely instrumental in bringing the port activities into the limelight from semiobscurity. He was active in the formation of the Maritime association of Boston of which he became a director, and during the last ten years his interest in the development of the Boston port as a whole has been a close second to his interest in the development of his own company's shipping service.

He left the inspection service and joined C. H. Sprague & Son, Inc. in 1918, taking charge of its marine department. At that time, this company's shipping interests were chiefly incidental to a large coastwise coal trade. Captain O'Donnell was quick to see the possibilities in the development of new shipping services out of Boston. He took over the management of a service to Mediterranean ports and developed this into a profitable venture. Soon after this he organized the American Republics line operating between the east coast of South America and United States ports, and he gradually built this service up until today it has 14 modern vessels on regular schedules. Captain O'Donnell was appointed vice president and general manager of this new line and he still retains this title although today the active management has been taken over by others in order to leave him free to devote attention to his new work with the Eastern Steamship Lines, Inc.

This new association involves a corporation with headquarters at Boston and with some 15 passenger and freight services along the north Atlantic coast. The principal lines out of New York are to Boston, Portland, Me., and Richmond, Va. The lines out of Boston include one to St. Johns, N. B., one to Yarmouth, N. S., and one

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ANNOUNCING the Alfite System

of carbon dioxide for marine fire protection

The two solution FOAMITE System has long been an outstanding method of protecting engine and boiler room spaces against fire.

Recently the FOAMITE Generator System was perfected—offering equal protection with less weight, space, and upkeep expense.

And, the manufacturer of these two fire protection systems also presents to the marine world the ALFITE System—a carbon dioxide system for the protection of cargo hold and similar spaces.

Carbon Dioxide is not new as a fire extinguishing agent. It is ideally suited to these particular risks. And it has proved its value beyond a shadow of a doubt.

The ALFITE System is the result of years of work on the part of American-La France and Foamite Engineers. It was developed by engineers who have been working with carbon dioxide since it was first applied to fire extinguishment. Behind it is all the skill and knowledge of fire fighting that this great company has acquired through its many years of manufacturing fire extinguishing equipment.

The ALFITE System has fewer working parts, is easier to operate, mechanically certain in its release of the carbon dioxide gas, and so simply constructed that its tanks can be easily refilled. It is approved by the U. S. Steamboat Inspection Service.

If you are interested in the application of the ALFITE System to your ships we will be glad to have a representative call and work out the necessary details for you. Write to your local branch or direct to the home office. American-La France and Foamite Corporation, Engineers and Manufacturers, Dept. J-7, Elmira, N. Y.

AMERICAN-LA FRANCE AND FOAMITE PROTECTION

A Complete Engineering Service

For Extinguishing Fires

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to Bar Harbor, Me. The company provides good service.

Captain O'Donnell is married and has a comfortable home in Allston, Mass., a suburb of Boston. He is a genial, well known and well liked man and while he has many interests outside of his own business these all center around the life of the sea. He has been active on many rate commissions, was a member of the committee to investigate the EASTLAND disaster on the Great Lakes and has been prominent in the formation of port laws and customs throughout the country.

He is a member of the executive committee of the American Steamship Owners association; a member of Lloyd's American committee, a director of the American Shipowners claims bureau, and a director of the Maritime Association of Boston. He is a power boat enthusiast and enters into the sport with spirit.

Two Railway Drydocks Underway at Quebec

Construction has been started on a new 1800-ton railway dry dock for George T. Davie & Sons, the old and widely-known ship repair firm of Levis, Quebec. The new dry dock is being built on the site of one of the old-time shipyards located beside the Canadian government dry docks.

This railway dry dock is being designed and built by the Crandall Engineering Co. Boston and it is of the Crandall type of dock. The cradle will be 250 feet long on the keel blocks and 68 feet wide. It will have 15 feet of water over keel blocks forward and 24 feet aft at spring high tides. A large part of the foundation is of concrete bearing on ledge rock. The track is of the three-way type, the upper part being of reinforced concrete and the under part of standard wood construction on a foundation of wood piling. The hoisting machinery is to be operated by steam and is expected to haul a capacity load in less than 30 minutes. It is expected that this railway dry dock will be completed this fall.

The Crandall company is also building another railway dry dock of the same capacity in Quebec City for the Morton Engineering & Dry Dock Co. Ltd., which is also expected to be in operation this year.

The Plymouth Cordage Co. of North Plymouth, Mass. has announced the opening on July 2 of a sales branch with ample stocks of rope and twines in New York city. The new office is located in the Transportation building, 225 Broadway. The warehouse is located at 522 Washington street.

National Fuels Meeting

The second national fuels meeting will be held at Cleveland, Sept. 17 to 20, under the auspices of the fuels division of the American Society of Mechanical Engineering.

Following the ideals at the first national meeting held in St. Louis last October, the sessions of the coming meeting will continue the campaign to effect a better understanding of the fuel situation and to aid particularly in the conservation and more economical utilization of fuel.

Papers dealing with the use of fuel in the propulsion of vessels will be delivered. Pulverized coal, mechanical stoker and oil burning as applied for marine purposes will be discussed.

Diesel Electric Towboat

The Tennessee Coal, Iron and Railroad Co. of Birmingham, Ala. has ordered two duplicate Nelseco engines, each of 550 shaft horsepower for use in their second diesel electric towboat now being built. The hull work is being carried out by the American Bridge Co. at the Ambridge, Pa. plant and the installation and completion work will be done by the Carnegie Steel Co., Pittsburgh.

This towboat which is a duplicate of the first will have the following dimensions: Length, 140 feet; breadth, 25 feet; and depth 9 feet 3 inches.

The installation will consist of two 550 brake horsepower Nelseco diesel engines built by the New London Ship & Engine Co., Groton, Conn., and will be direct connected to two 335-kilowatt, 250-volt General Electric Co. direct current generators operating at a speed of 250 revolutions per minute. The boat being of the twin screw tunnel stern type, each propeller will be driven by a 400 horsepower double armature motor turning at 140 revolutions per minute. The power for auxiliaries, lighting and excitation purposes will be furnished by two 40 kilowatt exciters driven off the main engines. The Ward-Leonard system of variable voltage control will be used and operating controls will be used both in the pilot house and in the engine room.

These modern towboats will operate between Birmingport, Ala. which is approximately fifteen miles from Birmingham, and Mobile. Due to the number of locks and the many sharp bends in the Warrior river, it was decided that a diesel electric craft would offer the greatest efficiency and flexibility for handling the heavy tows under the above conditions. The towboat will be of tremendous interest to all river transportation men.

Agreement Is Reached on Services to India

After several conferences between T. V. O'Connor, chairman of the United States shipping board, and J. A. Farrell, president, United States Steel Corp., the United States shipping board and the Isthmian Steamship line have agreed to co-operate in the development of the carrying trade between the United States and India, and on Aug. 9 concluded the arrangement.

Prior to 1920 there were no American steamers sailing direct from Calcutta and Colombo to South Atlantic and Gulf ports. Prior to 1923 there were no American steamers sailing from Calcutta and Colombo direct to North Atlantic ports. Since then the Isthmian Steamship line has maintained a regular service on these routes. In 1927 the shipping board entered the field and the competition of all lines, British and American, resulted in an excess of tonnage.

From the Editor's Mail

To the Editor:

We note in the August number of the MARINE REVIEW an article signed by Stephen E. Palmer, who was a passenger on the S. S. BLUE TRIANGLE, one of the ships owned and operated by this corporation. We greatly appreciate Mr. Palmer's expression of good will, and wish to thank you for publishing the article referred to.

There is one feature, however, which requires correction. Mr. Palmer refers to the management as "not wholly disconnected (so it is rumored) from a certain American railroad which 'hauls more freight, more passengers, more miles,' etc.

This is the first intimation that we have had that the corporation was affiliated directly or indirectly with any railroad corporation; and we take this occasion to assure you and the shipping public that no railroad has any financial interest in this corporation, and that the stock is privately owned and the corporation is in a position to serve all land carriers and shippers equally.

H. E. Frick,
Vice President & Gen. Mgr.
Export Steamship Corp.

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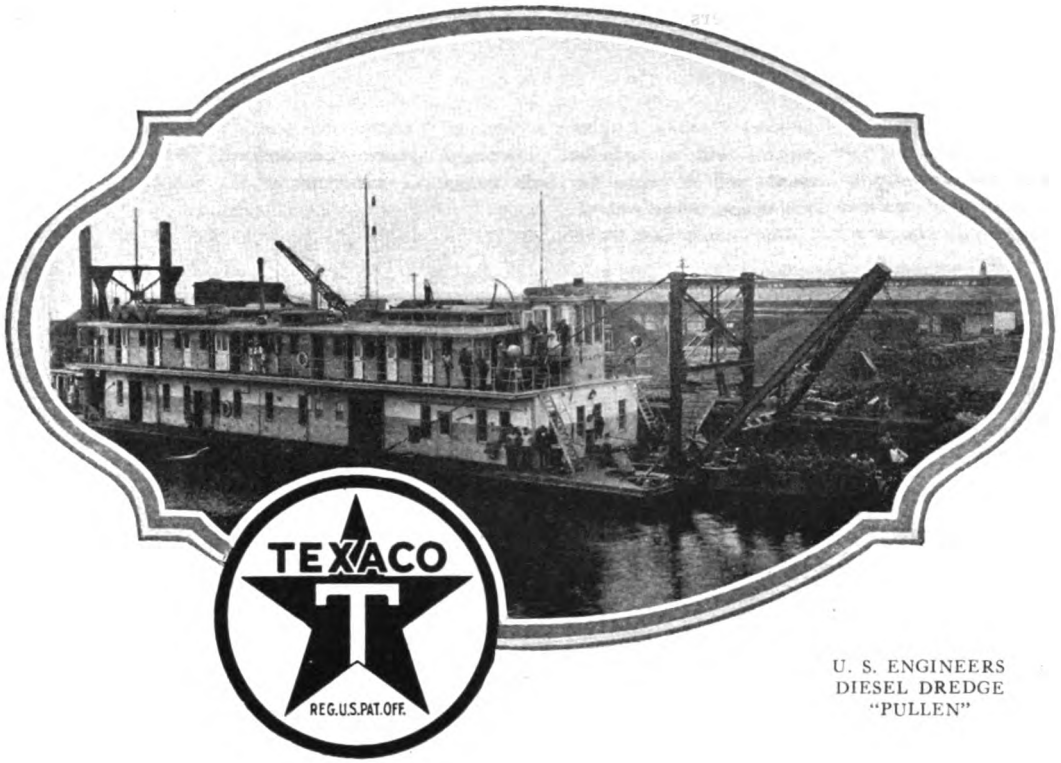

U. S. ENGINEERS
DIESEL DREDGE
"PULLEN"

In 1926 lubricated with TEXACO URSA OIL
In 1927 lubricated with TEXACO URSA OIL
Today lubricated with TEXACO URSA OIL

This dredge was built in 1926. It has been in the U. S. Engineers since that time.

Her engine equipment is as follows:

Winton Diesel Engine—500 H.P. For Pumps

Winton Diesel Engine—225 H.P. For Auxiliaries

TEXACO URSA OIL is a clean, clear, golden lubricant, scientifically refined to meet the requirements of Diesel engine lubrication.

TEXACO URSA OIL has been used to lubricate the Diesel Engines of the U. S. Engineers Dredge "Pullen" since the day she was built, in 1926.

TWO MORE GOOD REASONS FOR SPECIFYING TEXACO:

1. There is a **TEXACO** Lubricant for every purpose aboard ship.

2. The Texas Company's Marine Engineers are at your service to help you secure ideal lubrication — anywhere — any time.

Stocks kept at Ports throughout the World

THE TEXAS COMPANY

Texaco Petroleum Products

MARINE SALES DIVISION

Dept. K9, 17 Battery Place, New York City

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Launch S.S. Virginia

(*Continued from Page* 25)

into the construction of these vessels with an unusual enthusiasm, and much credit for this and for the successful way that the whole project has been planned and carried out must go to Homer L. Ferguson, president and general manager of the company. The architectural features and interior design of the VIRGINIA are the work of the Barnett Phillips Co., in association with J. Philip Kiesecker. This association of architects has proved a particularly fortunate one. The Barnett Phillips Co. has had long experience in handling the decorative features of public buildings and clubs and Mr. Kiesecker adds extensive experience in marine architectural work.

Electricity issued in a great many ways throughout the big ship. It operates the deck winches for handling cargo; supplies the cold air for refrigerators; mixes dough and bakes bread in the bakery; operates large ranges in the kitchen; regulates clocks throughout the vessel; furnishes heat for staterooms when needed, and also operates fans to keep passengers cool in hot weather and, of course, is invaluable in the operating control of the vessel. This control equipment includes the radio direction finder and electric steering device, bridge telegraphs, signal telephone, and remote control switches.

Recreational features include two swimming pools of the built-in type with water slightly below the level of the deck, and two ballrooms one outdoor and the other indoor.

Diesel Electric Vessel

The complete electrical equipment of the diesel electric propelling machinery of the new coast and geodetic survey vessel HYDROGRAPHER, now under construction at the plant of the Spear Engineering Corp., Norfolk, will be supplied by Westinghouse.

This vessel will be single screw and will displace 740 tons. She will have a length overall of 167 feet 5 inches, a molded beam of 31 feet 6 inches, and will draw 9 feet 6 inches forward and 11 feet 6 inches aft. Her designed full speed will be 12½ knots.

Power for propulsion is supplied by two engine generator units, each comprising a single-acting four-cycle Winton engine which develops 450 horsepower at 250 revolutions per minute and is directly connected to a main generator and a generator exciter. The main generators are shunt wound, separately excited, 250 volt machines of 270 kilowatts each. The generator exciters are compound wound, self-excited, 125 volt machines of 25 kilowatts each.

For the propulsion equipment Westinghouse variable voltage system of control will be installed. Arrangements will be made for both bridge and engine room control.

The propulsion motor, which develop 650 horsepower at 125 revolutions per minute, will be of the double armature type, with 250 volts on each armature. It is a shunt wound machine.

Most of the deck and under deck auxiliaries are electrified. These include engine room pumps and compressors, the anchor windlass, capstan, boat hoist and steering gear.

Diesel Conversion Bids For Eight Vessels

Dieselizing eight additional shipping board vessels will soon be under way. Bids were requested late in July on this work from nine private shipyards and three navy yards. Bids were duly opened in New York, Aug. 21, in the office of Capt. R. D. Gatewood, manager of maintenance and repair for the Merchant Fleet Corp.

The names of the vessels and the type of engines to be installed are: GALVESTON and OLDHAM, each to be fitted with one McIntosh & Seymour, five cylinder, four stroke cycle, double acting, 3900 brake horsepower diesel engine with an anticipated speed of 12.4 knots; CITY OF ELWOOD and WARD, each to be fitted with one Busch Sulzer, six cylinder, two stroke cycle, single acting, 3950 brake horsepower diesel engine with an anticipated speed of 12.5 knots; the NEW ORLEANS and WICHITA, each to be fitted with one Hooven, Owens & Rentschler, four cylinder, two stroke cycle, double acting, 4000 brake horsepower, diesel engine, with an anticipated speed of 12.5 knots; the JEFF DAVIS and PORTER, each to be fitted with one Worthington, four cylinder two stroke cycle, double acting, 3625 brake horsepower, diesel engine, with an anticipated speed of 12 knots.

The principal characteristics of these vessels after conversion will be: Length overall, 411 feet 9 inches; length between perpendiculars, 395 feet 6 inches; beam molded, 55 feet; depth to shelter deck 34 feet 11 inches; mean load draft, 27 feet; deadweight capacity, 9300 tons; regular crew, 36; with passengers and additional stewards, 53. The conversion will mean as it did in the first 12 vessels the removal of present machinery, boilers, etc., and the installation of diesel engines and auxiliaries. Passenger accommodations are to be installed in the forward house on the bridge deck. Dining room and pantry will also be fitted in this space. Quarters will be provided for a maximum of 14 passengers. All auxiliaries in engine room and on deck and to be electrically driven.

The bids opened Aug. 21 by Capt. R. D. Gatewood at 45 Broadway, New York city, showed the Maryland Dry Dock Co., Baltimore, with a bid of $1,064,368 for the installation work on any two ships to be low.

A summary of the bids follow:

Todd Shipyards Corp. GALVESTON, OLDHAM, CITY OF ELWOOD and WARD, $777,000 each; JEFF DAVIS and POTTER, $775,000 each; NEW ORLEANS, $757,500 and WICHITA, $756,000.

Newport News Shipbuilding and Dry Dock Co. CITY OF ELWOOD and WARD, $1,275,000.

Maryland Drydock Co. Any two, $1,064,368.

Morse Dry Dock & Repair Co. POTTER and JEFF DAVIS, $1,202,940.

Federal Shipbuilding Co. GALVESTON and OLDHAM, $1,258,000; JEFF DAVIS and POTTER, $1,258,000; CITY OF ELWOOD and WARD, $1,350,000; NEW ORLEANS and WICHITA, $1,354,000.

Bethlehem Shipbuilding Corp. Any two vessels, $1,347,000; GALVESTON and OLDHAM, $1,287,000; CITY OF ELWOOD and WARD, $1,333,000; NEW ORLEANS and WICHITA, $1,347,000; JEFF DAVIS and POTTER, $1,335,000.

United States navy yard, Boston. GALVESTON and OLDHAM, $1,342,819; CITY OF ELWOOD and WARD, $1,353,615; NEW ORLEANS and WICHITA, $1,359,428; JEFF DAVIS and POTTER, $1,344,536.

United States navy yard of New York. Any two vessels, $1,831,200.

These bids will be submitted to Admiral Cone, shipping board commissioner in charge of construction and it is expected that awards will shortly be made. If this is done the new fleet of eight diesel vessels should be ready within a year, coming out, of course, progressively during that period of time.

To Build Ice Breakers

Two ice breakers at a cost of about $1,000,000 each are to be built in Canadian shipyards. Specifications for these vessels have been prepared by the Canadian department of marine and bids will be requested. One of these vessels will be employed largely on the St. Lawrence river while the other is to operate on the Hudson bay and the St. Lawrence. This will give much needed work to Canadian yards.

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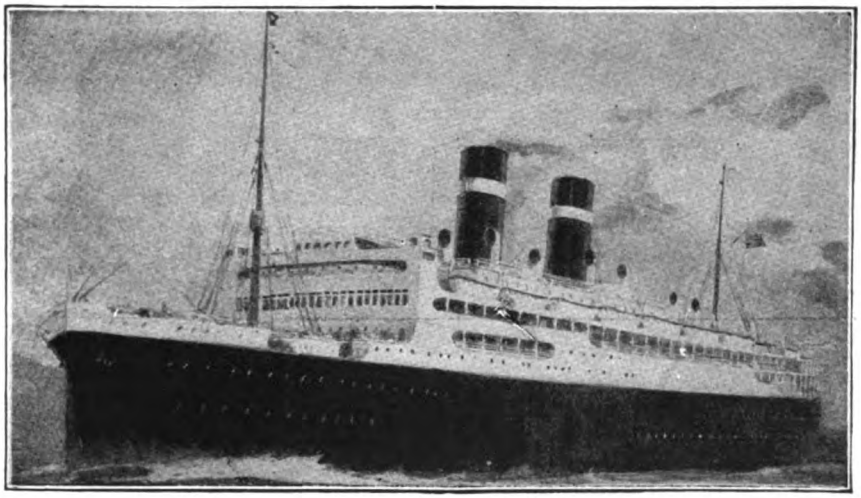


S.S. California

Smart Looking

- ▫ -

Built to wear--- "LIKE A BATTLESHIP"

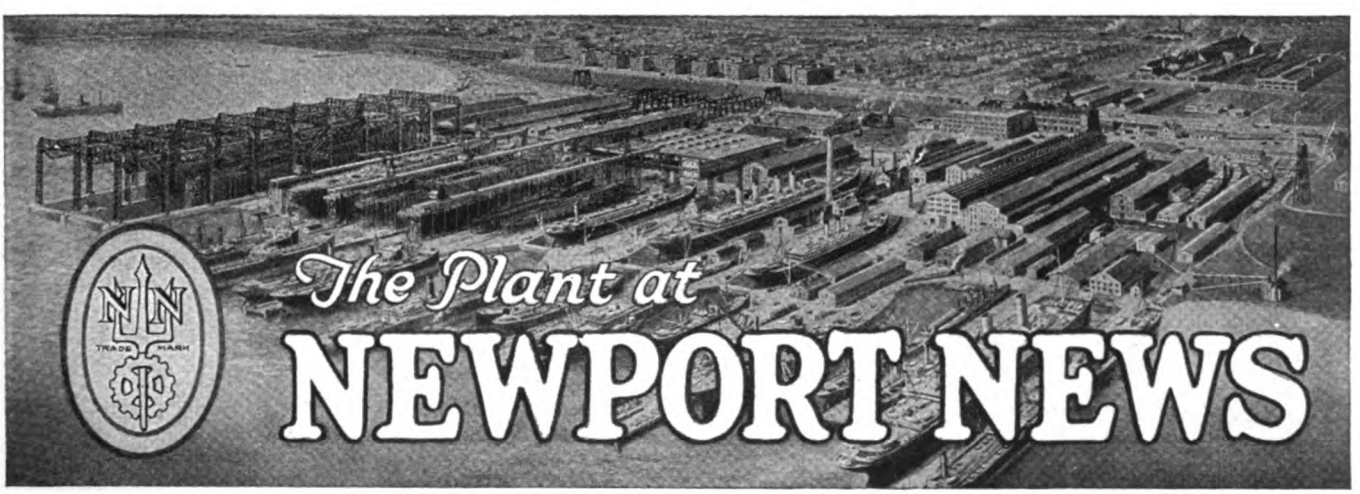
S.S. California, largest merchant ship ever built in the United States, is in every respect comparable to the finest transatlantic ships now in service. She will run between New York and California ports, her turbo-electric drive giving a speed of 18 knots.

Newport News Shipbuilding and Dry Dock Company ranks as one of the finest organizations in the world, in facilities for construction and repairs.

Our yard facilities are unequalled, labor is plentiful and good, and the climate permits outdoor work the year 'round.

If you desire fine ships, or are in need of quick dependable repair service, our Engineering staff will be glad to consult with you—without cost or obligation.

NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY
NEWPORT NEWS, VIRGINIA, U. S. A. - NEW YORK, 233 BROADWAY



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Scrap War-Built Ships

(*Continued from Page* 37)

lines were laid for lighting and equipment.

Winches were installed for moving the boats.

Many minor details had to be attended to; tool cribs, time clocks, first aid, drinking water, telephones.

Before the LAKE FONDULAC was completely scrapped two new ships, the LAKE ELIZABETH and LAKE FRENCHTON, had arrived. With them the major dismantling job got under way.

Shipping Board to Sell United States Lines

The date of opening bids for the purchase of the United States lines and American Merchant line has been postponed from Oct. 1 to Nov. 15. The advertisements inviting bids appeared in the newspapers around the middle of August, thus allowing 90 days for the preparation of bids.

Bids may be presented under ten different plans. In no case however, is it permissible to dispose of the ships of the two lines individually. Operation of the vessels over a five-year or ten-year term must be guaranteed by the bidder. The contract of sale will be modified accordingly if the ten-year guarantee is chosen instead of the five-year guarantee. After the first year of the longer guarantee contract the amount specified as liquidated damages and the bond to be given shall be reduced.

In either case the guarantee of operations will require that the LEVIATHAN shall make two round voyages between New York and the United Kingdom and a French port each sixty days between March 1, and Dec. 31 of each year. The LEVIATHAN must make a minimum of thirteen round voyages each year. In the case of the GEORGE WASHINGTON, the AMERICA, the REPUBLIC, the PRESIDENT HARDING and the PRESIDENT ROOSEVELT, one round voyage between New York and the United Kingdom, a French and a German port will be required each sixty days during the period from March 1 to Dec. 31. Ten round voyages a year shall constitute a minimum for each of these vessels. For the American Merchant lines a total of forty-five round voyages for the year will be required between New York and London.

It is understood that 2½ per cent of the bid purchase price must accompany the offer while 22½ per cent of the price of each vessel is payable at the time of its delivery. The balance must be paid in equal instalments over a period of fifteen years.

Michael F. Adams Dies

Michael F. Adams, general superintendent of the Baltimore plant of the Bethlehem Shipbuilding Corp., died recently in Baltimore. Funeral services were held in St. Elizabeth's church, Baltimore, Aug. 8. There was a large attendance of representatives from the plant and others in shipbuilding.

Drydock at Baltimore

The Maryland Dry Dock Co., Baltimore, has recently installed an additional dry dock at its plant in Baltimore harbor. The company now has two floating dry docks, each of the following dimensions: Length overall, 440 feet; width at entrance 80 feet 2 inches; capacity, 9000 tons and depth of water over sill, 23 feet 6 inches.

The plant is centrally located in relation to all terminals in the port of Baltimore. The yard covers an area of approximately 58 acres and contains 2¼ miles of railroad track. The shops are equipped with modern machinery. Piers adjacent to each dry dock are equipped with electric traveling cranes each of 25 tons capacity reaching to the center of each dry dock and also to the ships moored at the piers.

Ten vessels each 400 feet long can be moored at one time. The available draft is 25 feet. The yard has a particularly efficient system employed in cleaning oil tanks and disposing of residue. The organization is well trained and the plant is thoroughly equipped throughout with modern facilities for repairing, reconditioning and building vessels of all classes up to 10,000 tons in size.

Complete Repair Plant

The board of commissioners of the Port of New Orleans has announced the completion of the 1500-foot wharf constructed for the Todd Engineering, Dry Dock & Repair Co. on the right bank of the river. The company at the same time makes it known that its shop, office building, boiler house and other accessory construction are all completed and that the plant is now in readiness for the arrival of the 12,000 ton, electrically driven floating dry dock which will greatly increase the ship repair facilities already existing at the Port of New Orleans. Approximately $1,000,000 in total outlay on wharfs, building and equipment has already been made by the Todd company.

Plant Improvement at Pusey and Jones

Since the reorganization a year ago, plans have been in progress for the general improvement of the Pusey & Jones Corp. yard at Wilmington with particular attention given to the marine department. In order to give entire freedom and complete control in launching vessels, seven acres of land on the south side of the Christiana river opposite the plant has been acquired.

Early in August the work of demolishing a number of obsolete buildings had been completed. The new 50 x 100 feet forge shop is now well under way. Work is also progressing on the new 110 by 220 feet joiner shop which is a two-story building. The entire yard has taken on an efficient and shipshape appearance.

All the new buildings are of exceptionally heavy construction and will be equipped with the most modern tools and the latest devices for efficient material handling. With the completion of the improvement of the yard the Pusey & Jones Corp. will be well equipped for high class shipbuilding on an economical basis.

U. S. S. New Mexico Leads in All Competition

The highest awards for efficiency and excellence in performance for the year 1927-1928 has been accorded the U. S. S. NEW MEXICO, first electrically propelled battleship in the world. She has been awarded the honor trophies in battle efficiency, gunnery, engineering and communication. To receive all four awards for efficiency is a record never before attained by any battleship. President Coolidge was so impressed with this performance that he has sent letters of commendation to Rear Admiral W. D. Leahy, now chief of the bureau of ordnance, who commanded the NEW MEXICO during the first part of the year and to Capt. E. B. Larimer, her present commander.

The NEW MEXICO in winning the engineering trophy is the first vessel to have won this prize three times, having received this award for the years 1919, 1920 and 1921. Naturally the General Electric Co., builders of the electrical propulsion machinery and other electrical equipment for the NEW MEXICO is justifiably proud of this record.

The Brooklyn Polytechnic Institute conducts a course on diesel engines. The course is planned for the man interested in oil engines.

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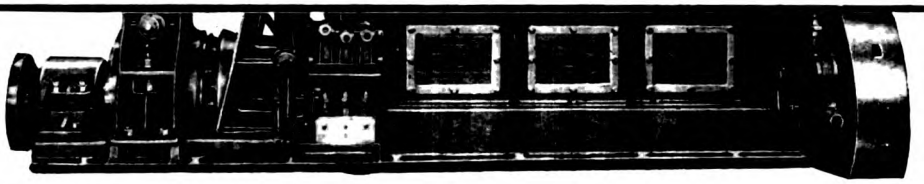
The Washington-Estep Goes Up The Yukon



WASHINGTON IRON WORKS

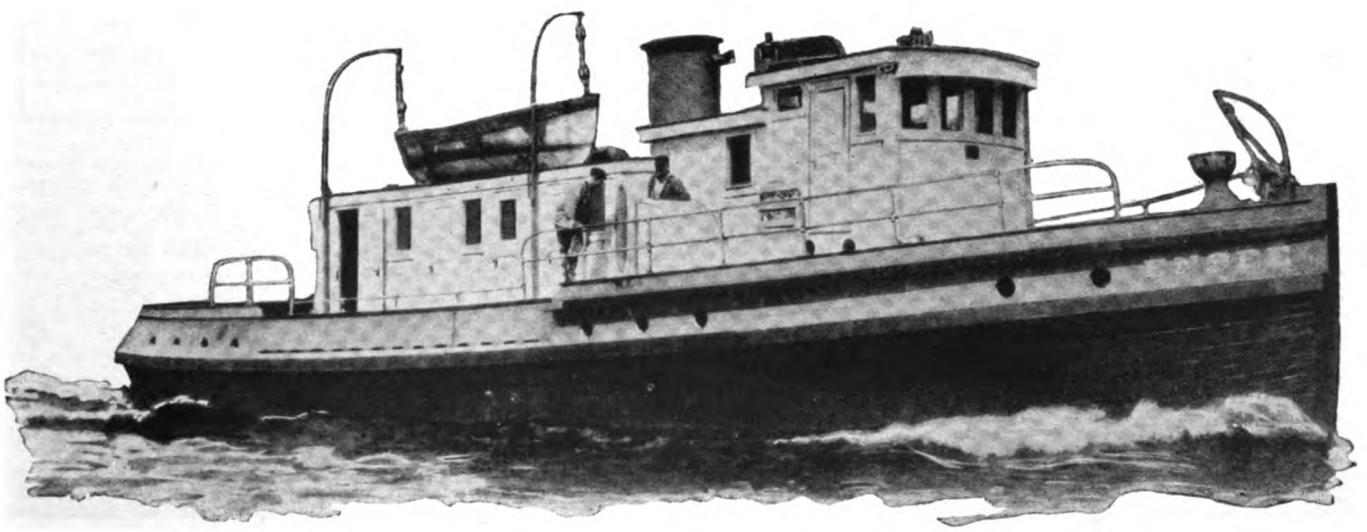
The "Ensee", a passenger, freight and mail boat, owned by the Northern Commercial Co. of Seattle, will run from St. Michels, Alaska, up the Yukon River. She is 72′ long x 18′ wide x 4′ 6″ draft and is powered with 2 - 3 cylinder 75 h.p. Washington-Estep Diesel Engines.

... and some of the reasons why

Accessible—Reliable—Economical
Open Side Main Frame
Pistons Removable from bottom of cylinders through doors in frame
Removable cylinder Liners
Extra Large Caged Valves
Force Feed Oiling System
All Bearings Extra Large and Adjustable
Sizes from 36 to 1800 b.h.p.

WASHINGTON IRON WORKS
Seattle, U.S.A.

Sexton Engineering Corp., 136 Liberty St., New York, N. Y.; W. H. Worden Company, Inc., Agents, San Francisco, Los Angeles; Eclipse Engineering Company, 321 Chartres Street, New Orleans, La. British Columbia Representative, Vancouver Machinery Depot, Ltd., Vancouver, B. C., Canada



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New Trade Publications

PULVERIZED COAL EQUIPMENT—Combustion Engineering Corp., New York, is distributing a reprint describing how it remodeled a large furnace plant for the use of pulverized coal, increasing steam production to meet larger needs. It is illustrated.

CHAIN HOISTS—A spur-geared, ball-bearing chain hoist is described in a bulletin by the Dickerman Hoist Mfg. Co., Cleveland. Illustrations show the hoist entire and disassembled and each part is fully described.

AIR COMPRESSORS—General Electric Co., Schenectady, N. Y., has published a loose leaf folder giving features of construction of its centrifugal air compressors. Operating characteristics and ratings also are supplied.

RECORDING INSTRUMENTS — Accurate facts on which to base conclusions is the text of a leaflet by the Foxboro Co. Inc., Foxboro, Mass. It presents illustrations of various types of its recording instruments which furnish facts on which to base many conclusions of value to the executive.

FIRE PROTECTION—An automatic device for delivering foam to extinguish fire in inflammable liquids is described in a leaflet by the Pyrene Mfg., Newark, N. J. Advantages of this method of extinguishing fire are set forth and its operation described.

RUST PROTECTION—A leaflet issued by the American Rolling Mill Co., Middletown, O., explains the process of rusting or oxidizing of iron and suggests the use of its product. The claim is that its purity will retard slow corrosion by the elements.

CENTRIFUGAL AIR COMPRESSORS—General Electric Co., Schenectady, N. Y., has issued a bulletin on its single stage centrifugal air compressors, illustrated in detail and presenting engineering data.

HOISTS—Silent Hoist Winch & Crane Co. Inc., Brooklyn, N. Y., has issued a folder showing several types of winches that it manufactures for various purposes.

DRILL POINTS—A correctly ground drill point and a number of incorrectly ground points are shown in a leaflet by the Morse Twist Drill & Machine Co., New Bedford, Mass. Faults in grinding and the resulting breakages are illustrated in halftones.

LIQUID METERS—A meter for measuring liquids, to give an exact record and guard against losses, is featured in a bulletin by S. F. Bowser & Co. Inc., Fort Wayne, Ind. Five sizes are shown, each applicable to a certain volume requirement.

NICKEL—American Mond Nickel Co., Pittsburgh, is circulating a booklet describing its nickel pellets for alloying. A description of how the pellets are built up in layers by a process which gives high purities is of interest. Application of nickel in various alloys is covered.

PORTABLE ELEVATOR—A hand power model with nonrevolvable base, one of its portable elevators, is described in a catalog section issued by the Revolvator Co., Jersey City, N. J. Details, specifications and applications are included.

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., in its current bulletin presents pushbutton stations for magnetic controllers, battery charging equipment and horizontal edgewise meters. All are well illustrated.

PUMP OILER—Plows Oiler Co., Minneapolis, is distributing a circular illustrating and describing its pump oilers, by which definite quantities of oil are ejected in lubricating machinery. A sectional view shows its construction and operation.

TURBINES FOR MECHANICAL DRIVE—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is mailing a bulletin on its turbines for mechanical drive. They are built in sizes from 5 to 750 brake horsepower. It is illustrated to show construction and method of operation.

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., has issued several bulletins on electrical devices. Included are bulletins on general purpose squirrel cage motors, magnetic reversing switches, pressure and vacuum switches, duplex controllers.

HEAT TREATMENT EQUIPMENT—Stanley P. Rockwell Co., Hartford, Conn., presents in a current bulletin a description of its method of heat treatment. It is illustrated by halftones and diagrams covering various features.

PYRO OPTICAL PYROMETER—Pyrometer Instrument Co., New York, is distributing a bulletin describing a simplified pyrometer it has designed for use where its former type cannot be advantageously employed.

CAST STEEL—Nugent Steel Castings Co., Chicago, has issued a bulletin telling of substitution of its steel in place of cast iron in wheels under a steam shovel. Hard service called for longer wearing of the metal, which was met by the steel cast wheels.

NICKEL IN BRASS CASTINGS—International Nickel Co. Inc., New York, has issued a bulletin dealing with the use of nickel in the production of brass castings. It is illustrated and advantages of nickel in the metal are described.

BELT CONVEYORS—Link-Belt Co., Chicago, has published a data book on belt conveyors which covers the subject with great completeness. The principles and advantages of belts for conveying large quantities of material at low cost are set forth. Illustrations of parts, diagrams of installations for various purposes and methods of applying power are covered. Data covering a wide range are provided. The book is unusually complete. Users of belt conveyors will find much of value in its pages.

STOKERS—Slicing Stokers Inc., Philadelphia, has issued a catalog describing its type of stoker for steam plants. Details of construction are illustrated and results attained by its use are described.

NICKEL ALLOYS—International Nickel Co., New York, has compiled a second edition of its buyers' guide. This is a classification of producers and fabricators of nickel alloy steel. The present listing contains additions and changes since the first was issued.

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., has issued a number of bulletins on its equipment. Current issues include: Direct heat electric furnace, automatic reduced voltage starters, cartridge units, metal melting pots, mechanical drive turbines, push and pull switches, electric turbines, duplex controllers, direct-current motors for steel mill main roll drives.

STEEL LOCKERS—An additional bulletin for its looseleaf catalog has been issued by the Durabilt Steel Locker Co., Aurora, Ill. It shows many uses of the company's product.

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., has issued a number of bulletins: Enclosed heavy duty starting rheostats, remote indicating speed controller, oil tempering baths.

HEAT TREATMENT—Lebanon Steel Foundry, Lebanon, Pa., in the current number of a series on electric furnace steel castings, takes up the subject of heat treatment. Illustrations include microstructures to suggest changes under heat treatment.

Business News for the Marine Trade

Acme Machine Co., Galveston, Tex., has been incorporated with $20,000 capital to operate a machine shop specializing in marine repairs, by W. J. Mead, 1919 Twenty-fifth street; W. E. Cleveland and Elizabeth Mead.

Kermath Mfg. Co., 5890 Commonwealth avenue, Detroit, manufacturer of marine engines and parts, will build a 3-story addition 30 x 60 feet.

Marine Service Inc., Houston, Tex., has been incorporated with $30,000 capital and has acquired property to build a marine service plant. A contract for a machine shop 50 x 60 feet will soon be let.

Zenith Furnace Co., Duluth, has awarded the general contract for enlarging its coal dock to the Whitney Bros. Co., Duluth. The new dock will have a capacity of 1,000,000 tons.

William Cramp & Sons Ship & Engine Building Co., Philadelphia, has closed negotiations for selling its dry dock and ship repair plant, known as the Kensington shipyard.

Dixie Steamship Co., New Orleans, has been incorporated with $125,000 capital by George Plant, and Harold LeJune, 1026 Whitney building.

Tug Luzerne has been incorporated at New York, with $30,000 capital by Babbage & Sanders, 111 Broadway.

South Jersey Port commission and board of city commissioners, Camden, N. J., are making plans for a marine terminal on the Delaware river. The main terminal unit will be 100 x 400 feet, with conveying machinery and traveling cranes. Upton S. Jeffreys is secretary of the port commission.

Waverly Marine Railway Inc., Waverly Mills, S. C., is planning a shipyard for ship construction and repair. Marine railroad equipment and machinery will be purchased.

Union Towing Service Inc., Lyndhurst, N. J., has been incorporated with $50,000 capital and 2000 shares no par value by W. N. Groendyke, Lyndhurst, N. Y.

Hudson Barge Corp., New York, has been incorporated with $12,500 capital to build boats, by J. V. Kane, New York, attorney.

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